



A look at the art of die-less duplicating...



DIE-LESS DUPLICATING . . . a technique of nature

Leaves on a tree represent one of the most basic forms of exact duplication. Unlike snow where each flake is different, Mother Nature makes each leaf on a branch identical in size and shape.

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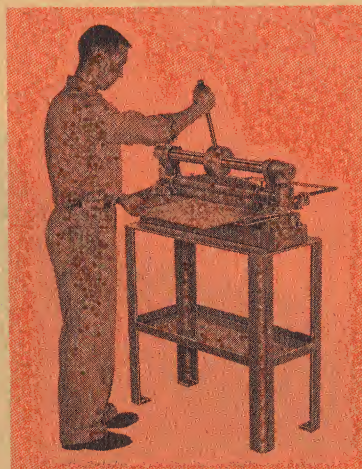
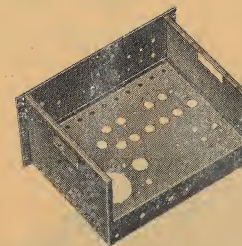
DIE-LESS DUPLICATING...a technique for industry

The use of metal through the years has expanded rapidly. New types and applications have constantly been added and metal today has progressed to a vehicle of inherent beauty, strength and pliability, and is available in almost every shape and size imaginable. When being formed and processed into products or component parts, metal is usually thought of in terms of large production lines, rows of machinery and a stockpile of inventory. Oftentimes the opposite is true and only a small production run or the making of models and prototypes is needed. These usually are uneconomically fabricated by hand, by tying up large and costly production equipment or by some other slow and equally inefficient method. A solution to this problem is outlined in the following pages of this booklet a "Look at the Art of Die-less Duplicating." Die-less Duplicating, perfected by Di-Acro, has been used successfully for years by manufacturers in all types of industry in their experimental labs, model shops and production lines to fabricate parts and components in a variety of shapes and sizes.

Although Die-less Duplicating is usually associated with the smaller hand operated Di-Acro Precision Machines – the Di-Acro Shear, Notcher, Punch Press, Brake, Rod Parter, Bender, Roller and Spring Winder – many manufacturers have found this system highly efficient with power operated Di-Acro Machines too. Type and size of material and quantity will in most cases dictate whether hand or power Di-Acro Machines are to be used. However, consideration should be given to the use of one or more of the hand operated Di-Acro models to relieve large cumbersome power machines of small or short run jobs. In many cases they will pay for themselves on the first job alone. In addition to their low original cost, Di-Acro Die-less Duplicating Machines offer an additional advantage in that they can be used over and over again for many different jobs . . . not just one. They require little or no experience to operate – even by women – and can be easily moved from one department to another.

THE DIE-LESS DUPLICATING CONCEPT

Di-Acro Die-less Duplicating Machines used in sequence can produce a completed part as shown at right.



SHEARING . . .



sheet material to exact size required is quickly and accurately accomplished with the Di-Acro Shear. Micrometer Gauges allow shearing tolerances of plus or minus .001". When shearing solid bar, the Di-Acro Rod Parter shears bar stock quickly and accurately with no distortion. Burr-free "part" saves time and expense of additional finishing operation.

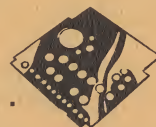
NOTCHING . . .



corners with a tab for chassis forming is a simple operation on the Di-Acro Tab Notcher. Size and degree of notch is accurately controlled by built-in gauges. Tabbed corners add additional strength, allow spot welding, and make a neater appearance. Gauges and blades adjust quickly to change size of notch and tab.



PUNCHING . . .

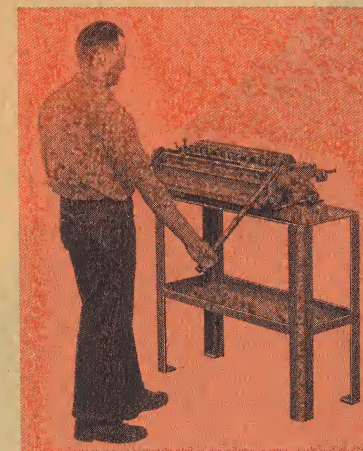


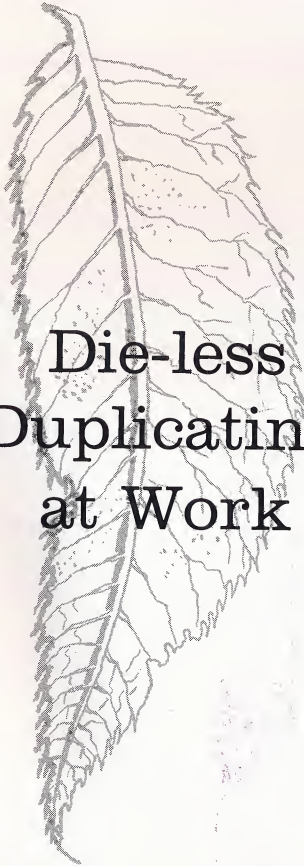
holes of various sizes and shapes in sheet material is quickly performed using either the Di-Acro Single Station or Turret Punch Press depending on the number of holes to be punched and quantity of run. Horn Punch with table attachment punches either pre-formed or flat stock.

FORMING . . .



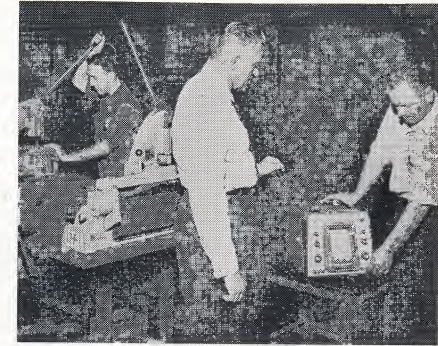
the punched blank on a Di-Acro Brake is fast and accurate. Many angles, shapes and sizes can be formed simply by setting the Brake fingers in proper combination. Undercut fingers will accept a lip or flange. Braces or other component parts on the chassis can be formed on a Di-Acro Bender. Bender can be quickly tooled to form flat stock, channel, tubing, bar stock, etc., into many shapes.



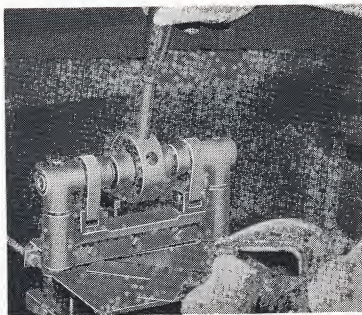


Die-less Duplicating at Work

Di-Acro Die-less Duplicating Machines perform a wide variety of jobs for a leading manufacturer of measuring equipment. "For over ten years, we have used Di-Acro Equipment in our press room area for anything that can be sheared, pierced or formed," says Brush Instruments, Division of Clevite Corporation, of Cleveland, Ohio. ■ At Brush Instruments a Di-Acro No. 1 Punch Press, Notcher and No. 24 Box Finger Brake are used in prototype and short run production. A wide range of materials are formed, including aluminum, mild steel, brass, phosphorous bronze and stainless steel. Tolerances on all the work are held to within plus or minus .005". ■ Brush Instruments manufactures equipment used for measuring all types of electrical or mechanical phenomenon such as stress, strain, torque or torsion. At top right, Brush Instrument personnel examine a Brush Recorder produced with the help of Di-Acro Equipment. ■ Di-Acro Machines have proven their versatility many times over at Brush Instruments. "Our Di-Acro Equipment is extremely valuable when we get crash programs. It saves tooling time and expense. Often when a production machine breaks down, we set up the Di-Acro Machines in a hurry to complete the job. These machines are also used to supplement our power fabricating equipment and also save setting up a larger machine." At the lower right, radiation shields are being punched on a Di-Acro Punch Press. A Di-Acro Notcher and Box Finger Brake are mounted on the bench.



A Di-Acro Hand Shear, in operation for over fifteen years, sizes the blank for a shield to be used on Addressograph Machines.



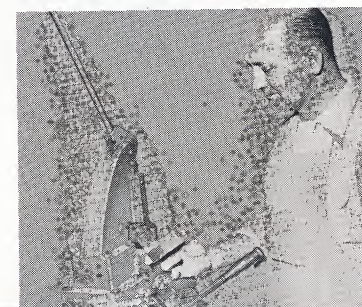
Di-Acro Notcher cuts two notches in sized blank. Notches must be burr free and accurately positioned.



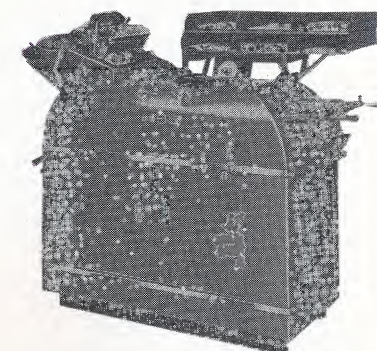
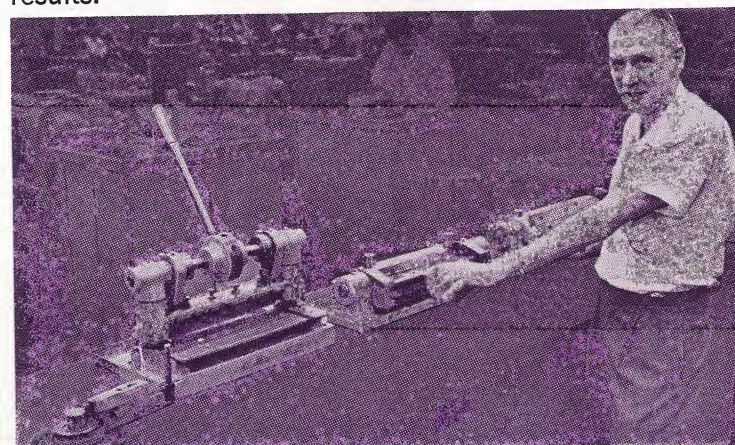
Di-Acro Brake forms sized and notched blank, holding tolerances to plus or minus .005".



Finished part has been duplicated to "die-accuracy" without the use of dies. The same accuracy can be held for succeeding parts.



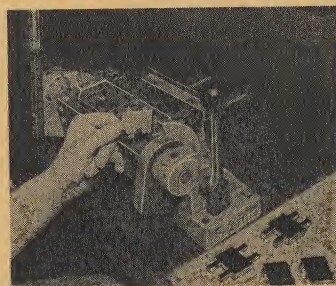
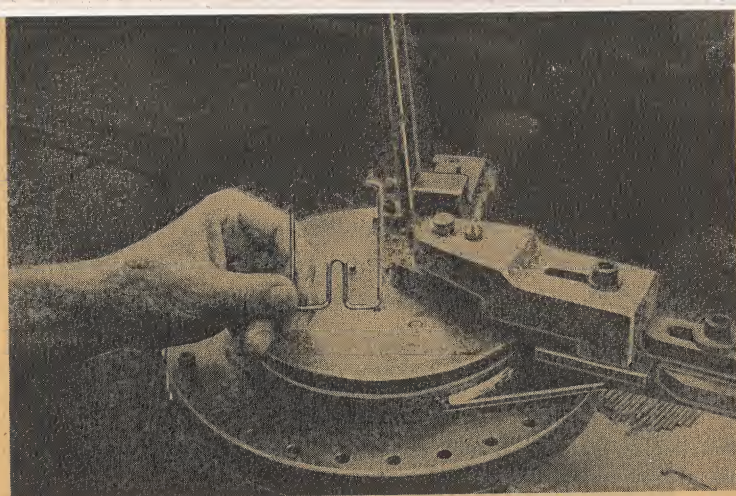
Die-less Duplicating Machines have paid for themselves many times over at Addressograph-Multigraph Corporation of Cleveland, Ohio. The special parts department at A-M employs a Di-Acro Shear, Notcher, Brake, Bender and Box Finger Brake for short run specialized production. ■ "These machines are in use every week," said an A-M spokesman. "The machines are used for the fabrication of special parts and for short run production. Tolerances from plus or minus $\frac{1}{64}$ " to plus or minus .005" are held, depending upon the operation." ■ In the Addressograph-Multigraph model shop, a Di-Acro Bender, Shear, and two Brakes are used. Here is where Di-Acro Equipment really meets the test of versatility. "For building of prototypes and for experimental work, Di-Acro Equipment is a must . . . it's easy to set up, reset, breakdown and accuracy is good," says A-M. ■ Over the years they have used Di-Acro Equipment, A-M has experienced very little service or repair on any of the machines, although they are in constant use. A Hand Shear purchased over 15 years ago has required only periodic lubrication and occasional blade sharpening. ■ Addressograph-Multigraph gives a typical example of production savings with Di-Acro Die-less Duplicating. "Setting up a mill or saw to do a cutting job takes considerably more time than to shear the same part on a Di-Acro Shear. We save setup time and get better results."



Class 1250 Multigraph Multilith Offset Duplicator with Automated Features.

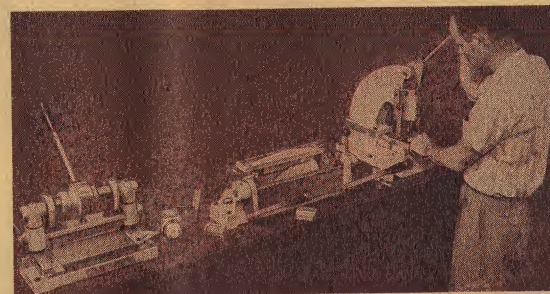


Die-less Duplicating plays a vital role in many sheet metal shops boasting a high degree of sophistication. Collins Radio Company of Cedar Rapids, Iowa uses over twenty hand operated forming machines to complement two tape-controlled punch presses and dozens of hydraulic presses ranging to 250 tons capacity. Small complex parts are produced on a regular production basis on Di-Acro Benders, Brakes, Notchers and Shears. Because of the size and intricacy of most of these parts, other methods of production are out of the question. Skilled operators have a wide range of tooling at their disposal and are responsible for their own setup. Parts samples are used to aid setups for repeat runs and insure "die-accurate" duplication ■ Collins Radio manufactures communications equipment precision engineered and assembled to fine tolerances. The need for accurate duplication of vital parts makes Di-Acro Die-less Duplicating Equipment indispensable for forming intricate precision components. Many parts are so small they could not be produced on larger equipment as shown in the photo, top left. ■ Collins Radio uses Die-less Duplicating Equipment in a true production operation. Standards are set, operation charts are written and tooling allowances are made for parts to be fabricated. It amounts to having a completely self-sufficient job shop right on the production line. ■ Time is often a determining factor in small parts production at Collins. Here again Die-less Duplicating shows itself to be invaluable. Rapid tooling changes insure that rushed production schedules will be met at lower cost than by other methods.



Many intricate business machine parts are formed economically on Di-Acro Die-less Duplicating Equipment at National Cash Register Company.

■ On regular production runs, NCR has been using a No. 1A and No. 3 Di-Acro Bender on an average of forty hours per week for many years. Due to their ease of setup and all around versatility, the same machines serve double duty when used for maintenance on other machines, tools, and plant fixtures. ■ Parts, such as the bill weight wires shown in the top photo are formed in large quantities. Other small parts too numerous to be economically stocked are produced in small lots to exacting tolerances. Fast setup means that all parts can be "stock" items, produced rapidly as needed by Die-less Duplicating. ■ Together with Di-Acro Benders, NCR uses Di-Acro Brakes, as shown at right, for precision forming of small parts. The Brakes provide versatility needed when forming the wide variety of parts used by NCR.



Increased accuracy coupled with cost and time savings are some of the benefits of Die-less Duplicating realized by P. R. Mallory and Company, Indianapolis. ■ A Di-Acro Shear, Punch and Brake with open end finger are used daily for experimental work and developing new electrical switches. Both metals and plastics are worked to plus or minus .005".

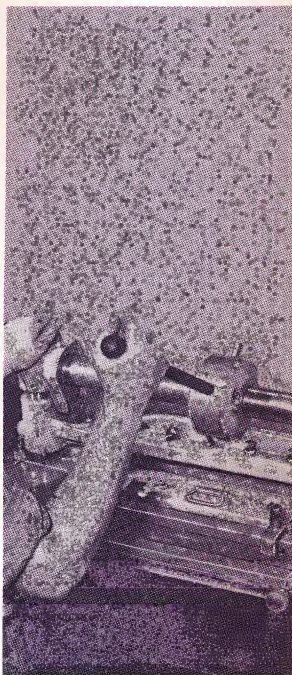
Anton Labs of Brooklyn, New York forms a wide variety of metals to $\frac{1}{16}$ " thick with controlled precision on Di-Acro Die-less Duplicating Equipment. ■ Making parts for prototype electronic equipment demands precision, the kind delivered by all Di-Acro Equipment. Like many other firms, Anton uses their Di-Acro Machines for maintenance work too.



The Die-less Duplicating Concept

WITH DI-ACRO
SHEARS

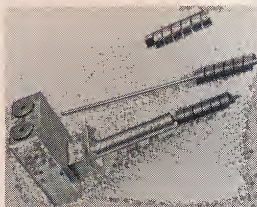
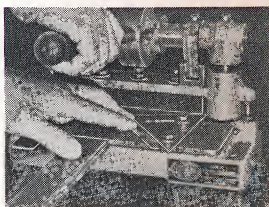
Although shearing of sheet material is a common procedure in almost every plant working with metal, never had special equipment been offered for small piece shearing until the advent of Di-Acro. Now a Shear is available having a maximum width of 6 inches that will shear both thin and heavy sheet material on a production basis with precision accuracy. The same speed and accuracy is found in the larger Di-Acro Models with shearing capacities to 36 inches.



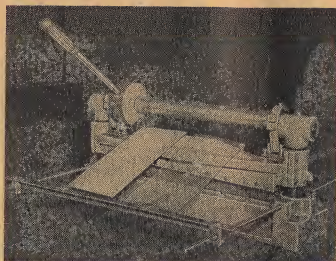
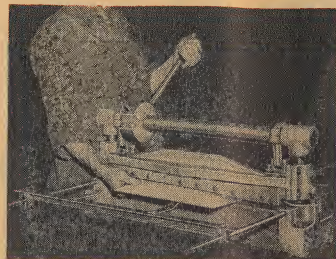
Swedish steel doctor blades for roto-gravure presses are sheared to plus or minus .002" squareness over their 15 inch length by a Di-Acro hand operated Shear. Oliver Machinery Company, Grand Rapids, Michigan has equipped their Shear with a special jig for the specialized operation. The doctor blades, used to wipe excess ink from roto cylinders, are made from .003" to .005" spring steel. Clean, burr-free cuts are a must in this operation, formerly done by a hand fitting and "grinding in" method.

Cutting bi-metals to extreme accuracy without distortion is the job Metals and Controls Corporation of Attleboro, Mass., assigned to their No. 1 Di-Acro Shear.

Use of a Di-Acro Shear instead of hand shearing has resulted in fewer rejects for this company. Many different angles are cut by using the Shear's protractor gauge.



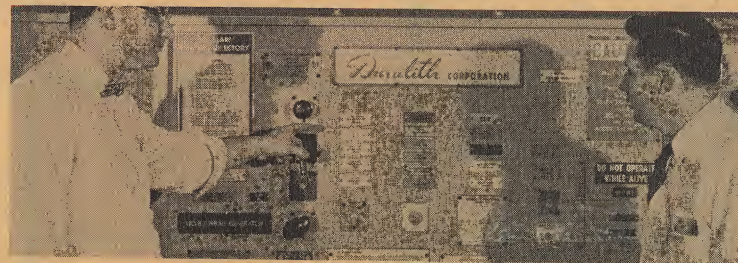
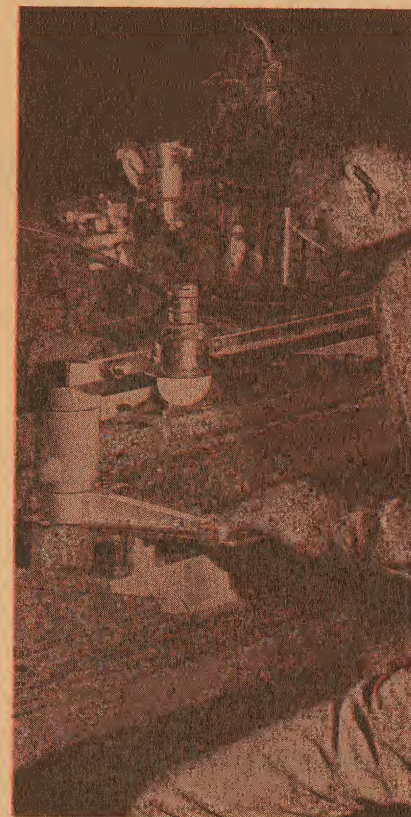
Cutting material to size from coil stock is done with a hand operated Di-Acro Shear by Columbia Metal Products, Inc. of Columbia, Tennessee. Aluminum sheets and Alclad wire cloth are cut to $6\frac{1}{2}$ " x $15\frac{1}{2}$ " dimensions from coil stock on a 24" Di-Acro Shear. ■ Material being worked is .025" aluminum used in the manufacture of vents for building foundations. Cutting speed of the Di-Acro hand Shear rivals that of power shears, making it ideal for cutting sheets to size from sheet or roll stock. ■ A clean, burr-free cut insures that the sheet will be ready to work without extra filing or deburring. Micrometer operated back gauges are standard equipment on all Di-Acro overdriven Shears. This back gauge allows rapid setup and close repeat accuracy for short or long run operations. ■ As shown at top right, the handle of the Shear can be moved to the side to allow more convenient feeding of strip or roll stock. The Shears ease of operation insures that production speeds can be maintained on short or long runs.



Thin gauge stainless steel is accurately sheared by Solar Aircraft Company, San Diego, California, on a hand operated 24" Di-Acro Shear. .001" to .020" gauge foil used in sub-assembly fabrication for high temperature brazed assemblies is sheared with minimum distortion. ■ Accuracy and fast setup are important at Solar when assembling experimental thin gauge components. The Di-Acro Shear meets these requirements and more, providing ease of operation and low maintenance as well. A clean, sharp cut is always assured with Di-Acro Shear blades equipped with four cutting edges. Adjustable blade rake lets the operator select the right angle for the material being worked.



Precision and low cost is a combination that has sold Duralith Corporation on hand operated Di-Acro Shears. ■ "Precision is one of the chief advantages our Di-Acro Equipment provides," said a Duralith spokesman. "For our plastics applications, Di-Acro Machines are the lowest cost units we could buy to do the job in the manner in which it had to be done." ■ Duralith, of Philadelphia, Pa., uses two 24" and one 12" Di-Acro Shear for cutting plastics and aluminum clad materials. "The fast, multiple setups we can make on this equipment without a lot of additional cost are of advantage to us. And we can cut strips as narrow as we want, even $\frac{1}{8}$ " strips of Duranyl." ■ For their application, Duralith has equipped a 24" Di-Acro Shear with an air cylinder as shown for added production speed.





No. 1 Di-Acro Shear



No. 3 Di-Acro Shear

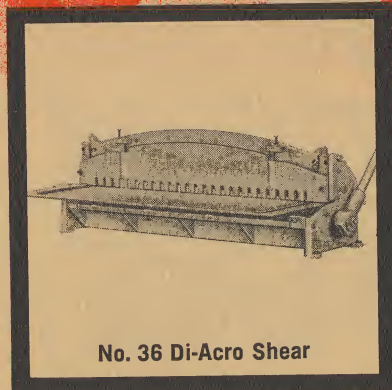
Di-Acro Shear Models

Models 1, 3, 4

Shearing to die-accurate standards is possible with easy-to-operate Di-Acro Shears. Ideal for experimental and short run production operations. Cutting speeds with these Precision Machines often rivals that of large power models, making them ideal for production operations and all shearable materials. Di-Acro Shears are produced from alloy castings and cold rolled steel bars. Cutting blades are made from alloy steel, properly hardened and precision ground.

Model 36

A full 36 inch width with minimum operator effort is possible with this Machine because of its powerful eccentric leverage operation. Other valuable features include an inclined ram, roller bearings, bed adjusted lower blade, blade straightener, material hold down bar, machined cast and plate construction.

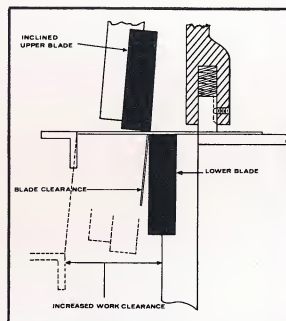


No. 36 Di-Acro Shear



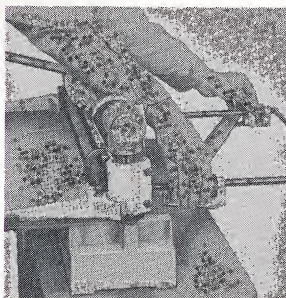
No. 4 Di-Acro Shear

INCLINED RAM, on Model 36 only, sets shear blades at an angle to work so that only blade edge is in contact with material — beveled effect tends to reduce shearing force or pressure. Inclined ram approach helps counteract thrust, keeps blade straight.



MICROMETER BACK GAUGE

Standard equipment on all hand operated Di-Acro Shears, quik-set micrometer back gauge enables speed and accuracy when changing from one setting to another. Gauge is graduated in .001". One complete turn of the micrometer dial moves the gauge 1/10 of an inch. Gauge can be quickly moved from setting to another by depressing spring loaded micrometer dial and sliding gauge on threaded rod.



SPECIFICATIONS — DI-ACRO SHEARS

Models	No. 1	No. 3	No. 4	No. 36
Maximum shearing width	6"	12"	24"	36"
Material capacity, mild steel	16 ga.	16 ga.	16 ga.	16 ga.
Floor space required (on stands)	15"x18½"	25"x24"	20"x38"	20"x48"
Weight lbs., Net	35	135	260	360
Shipping	40	145	300	400
Export	50	165	340	420
Price	\$160.00	\$345.00	\$465.00	\$575.00
SHEAR BLADES ONLY				
Alloy Tool Steel (per set)	\$13.00	\$25.00	\$40.00	\$55.00
Hi-Carbon-Hi-Chrome (per set)	25.00	75.00	45.00	105.00
ADDITIONAL EXTRA when Hi-Carbon-Hi-Chrome blades are installed in place of Alloy Steel blades	12.00	20.00	35.00	50.00
STAND	\$55.00	\$60.00	\$65.00	\$70.00
Weight lbs., Net	86	96	108	165
Shipping	98	100	112	171
Export	70	135	148	190

STANDARD EQUIPMENT SHEARS No. 1 - 3 - 4 - 36

Material Hold Down Bar — Models No. 3 - 4 - 36 Only

Side Squaring Gauge

Reversible Protractor Gauge

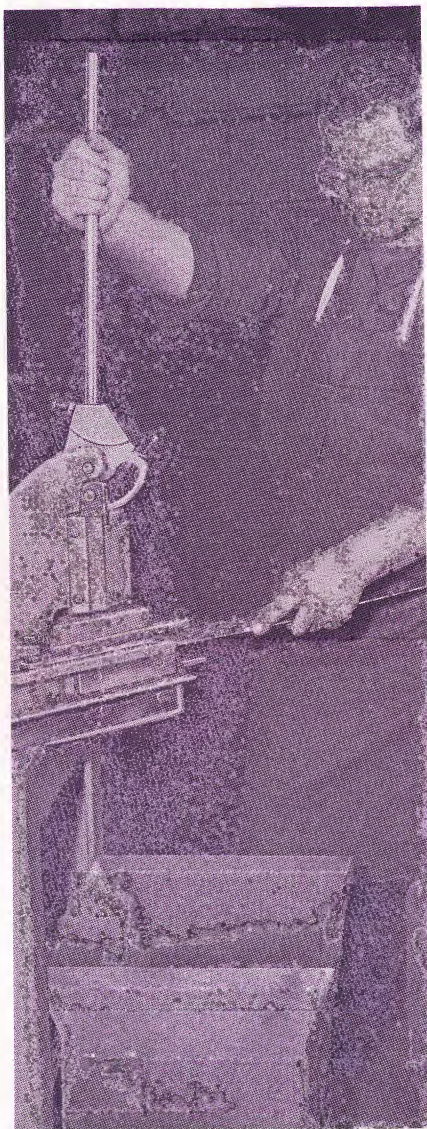
Set of Four-edged Alloy Tool Steel Blades — Model No. 1 — Two-edged Blades

Micrometer Back Gauge

Long and Short Operating Handles — Model No. 1 - 36 one only

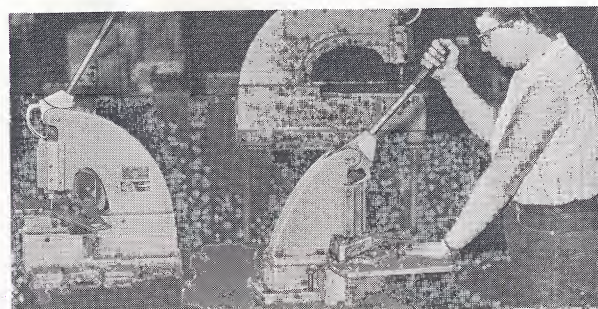
Blade Stop for slitting operations

Di-Acro Shears are also available in Foot Operated and Power Models. For more information write for catalog.



Quality and production speed have been substantially increased by use of a Di-Acro Notcher at Miller Electric Manufacturing Company of Appleton, Wisconsin. In the production of famous Miller Arc Welders, the Notcher has been at work thirty to forty hours a week cutting angles and corners in material as heavy as 16 gauge cold rolled steel. The job involves notching blanks used to make cabinets for welders and requires both precision and speed to meet production demands. ■ With its ground triangular ram, the Di-Acro Notcher maintains tolerances to .001" at Miller. Production speed is assured by the ease of operation, even in heavy stock, afforded by Di-Acro's roller cam action. ■ Rapid gauging cuts down setup time on the Di-Acro Notcher and assures repeat accuracy. A wide variety of angles and notches can be cut simply by changing the gauge setup. Reversible blades on the Di-Acro Notcher minimize downtime for blade sharpening at Miller.

"It's faster than setting up a punch press with notching dies. The Notcher gets a tremendous amount of use." ■ These are the comments of Chapter Manufacturing Company of Sun Valley, California on the use of a Di-Acro Notcher in fabricating containers for the electronics industry. Chapter uses the Notcher in conjunction with other Di-Acro Equipment to form a wide range of materials, metals and thicknesses.



Chapter Manufacturing performs prototype and short run production, relying almost entirely on Di-Acro Dieless Duplicating Equipment. ■ "We actually built this business with Di-Acro Equipment," was the comment of a Chapter spokesman. Chapter uses women to operate some of their machines because of the easy setup and simplicity of operation. Tolerances throughout the fabricating operation are held to within .005" to .010" with the rapid, easy to operate gauging system used on Di-Acro Equipment.



A Di-Acro Notcher was chosen by Pako Corporation of Minneapolis, Minnesota for forming special small parts on film processing equipment. ■ Alternatives to the Notcher were tinsnips or expensive die sets specially made for each operation. On all counts the Notcher proved superior and has been in operation 40% of the time since it was purchased forming many short run parts. For long production runs, Pako has equipped their Notcher with special gauging to increase speed.



Notches formerly cut with a band saw are now made with a hand operated Di-Acro Notcher at Magnesium Products of Milwaukee. ■ Magnesium Products produces many standard and special products from lightweight metal. They have found a distinct advantage in time saved and product quality by using a Di-Acro Notcher. Magnesium Products is also impressed with the versatility of their Di-Acro Notcher and other Di-Acro Equipment. "We can quickly switch from one job to another or set up so that a complete part can be fabricated at one time." ■ Another important plus for Magnesium Products has been the portability of their Di-Acro Equipment. Production lines can be set up in any part of the plant with many different combinations of Die-less Duplicating Machines.

The Die-less Duplicating Concept

WITH DI-ACRO
NOTCHERS



One of the basic advantages of a Di-Acro Notcher is the economy of eliminating special die sets for each different size notch, and the speed of setup. Whether it's just a small "snip" or a full 6 x 6 inch notch with a tab in one operation, to change setups takes just minutes. Although especially useful where box, chassis and panel blanks are to be made, many Di-Acro customers are also using the Di-Acro Notcher for small shearing and slitting operations.

TAB NOTCHER — Although the case histories to the left show the regular Di-Acro Notchers in use, Di-Acro has recently introduced a Tab Notcher which opens up a whole new area of design possibilities and production savings on finished parts because the job can now be done quickly and simply by spot welding an overlapping tab. This not only steps up production but results in a finished job that is stronger and neater. Clean, even cut of the Di-Acro Tab Notcher means material savings, too. Material notched or sheared from the blank is not mutilated — can often be used for other purposes.

Both upper and lower cutting blades of the Tab Notcher are adjustable to give you any size and depth, regular or tab notch combination to a 6 x 6 inch notch and up to a 1 inch tab in the corner or at any position along the edge of a sheet in one operation.

Additional features of the Tab Notcher include heavy steel work table with built-in scales graduated in 1/32" for easy reading. Material gauges slide in a slotted track to prevent misalignment and are permanently squared. Heavy duty construction means continuous day in and day out operation with accuracy and years of trouble free performance.

STANDARD NOTCHER — A real money maker, too. The Standard Notcher notches all shearable materials up to 6 x 6 inches but is without the tab feature. Ease of operation makes possible production rates which often rival those of power driven equipment. Powerful action of the Notcher is obtained through use of a roller cam; minimum operator effort is needed. Notches larger than 90° can be made in two operations. Same heavy duty construction and precision workmanship as the Tab Model assures years of accurate, profitable operation.

Di-Acro Notcher Models

SPECIFICATIONS — DI-ACRO NOTCHERS

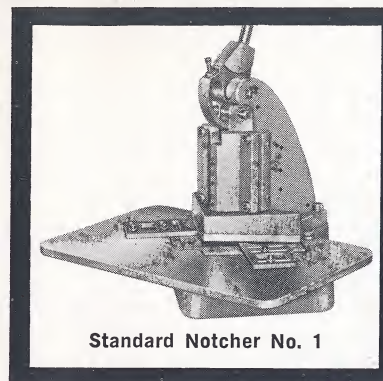
Models	Standard No. 1	Tab No. 2
Maximum 90° notch (one operation)	6"x6"	6"x6"
Maximum Tab	....	1"
Maximum material capacity — sheet steel	16 gauge	16 gauge
Rated capacity	4 tons	4 tons
Stroke of ram	5/8"	5/8"
Floor space on stand	15"x17"	17"x24"
Weight lbs., Net	125	225
Shipping	148	248
Export	170	270
Price	\$275.00	\$395.00
Stand, Weight lbs., Net 85,		
Shipping 90, Export 150	\$55.00	\$55.00
Notcher Blades		
Alloy tool steel (per set)	\$35.00	\$55.00
High carbon-high chrome (per set)	\$55.00	\$75.00
High carbon high chrome blades extra when installed in place of alloy steel blades	\$20.00	\$20.00

STANDARD EQUIPMENT

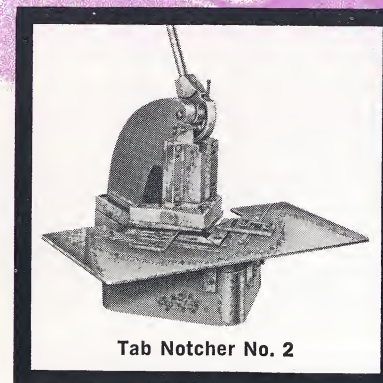
Standard Notcher No. 1 — Short and long operating handle, 12 x 18 in. work table, adjustable gauges, hardened alloy steel notcher blades with reversible cutting edges.

Tab Notcher No. 2 — Short and long operating handle, 12 x 24 in. work table with built in scales, adjustable self-squaring gauges, hardened steel notcher blades with reversible cutting edges.

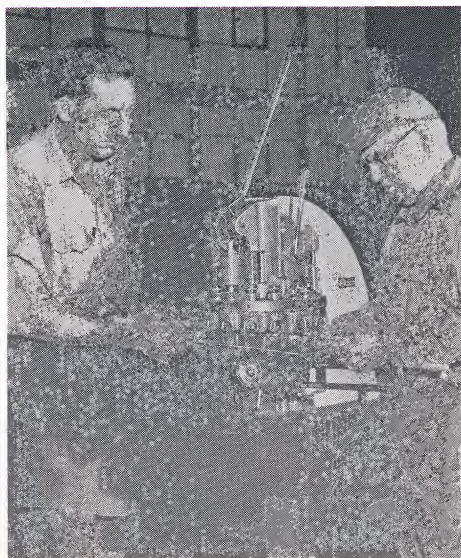
Power Models are also available. For complete information write for catalog.



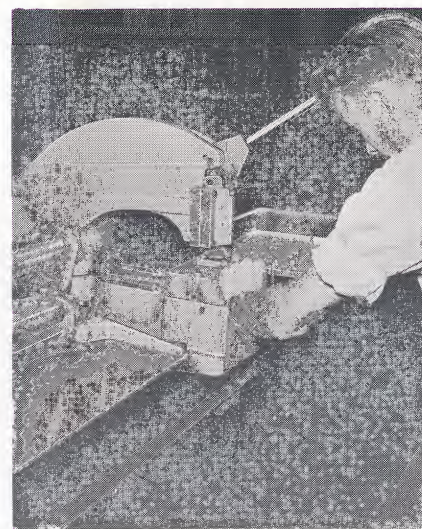
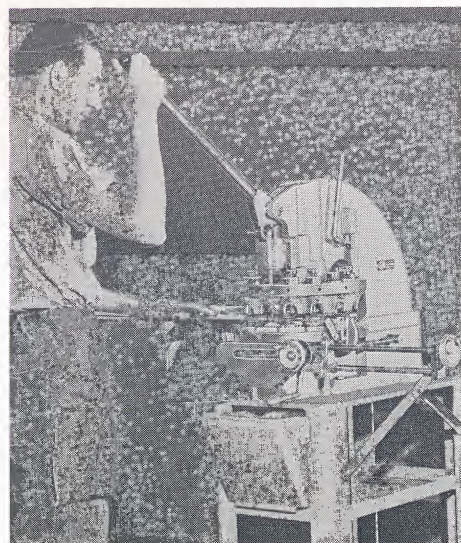
Standard Notcher No. 1



Tab Notcher No. 2



Punching time was reduced by at least 50% when John J. Nesbitt, Inc. installed a 12 Station Di-Acro Turret Punch Press. ■ The Philadelphia company said, "With its twelve station capacity, we just swing the turrets of the Punch Press around until we have the right size punch and die for the job without any set-up fuss." On many jobs, no tooling change is required. The 12 station Punch Press solved the time consuming problem of installing a new punch and die set for every different size or shape of hole for Nesbitt. ■ Nesbitt manufactures air conditioning equipment. Their Model 12 Di-Acro Turret Punch Press is used in the sheet metal shop for short run production and component parts for pilot models. Materials worked by the Philadelphia firm range from 18 to 11 gauge in ductile metals. Roller cam action of the Punch Press provides ease of operation and means that production speeds can be maintained. Tolerances of plus or minus $1/32$ " are held on all work with no difficulty. Die-less Duplicating has proven its value to the Nesbitt Company many times. A spokesman commented, "When we have to produce 'right now' it's machines like this we can depend on."



Precision punching of electronic chassis and cabinets with all hole centers held to within plus or minus .005". ■ Mid-Continent Engineering Company, Minneapolis, Minnesota assigns this exacting work to their No. 2 Di-Acro Punch Press on a day-in day-out basis. ■ In use three to four hours a day, the Punch Press is used to make pilot models for individual customers as well as air ducts and related equipment. Material punched is mainly .062" aluminum sheet. While speed is not often a production factor at Mid-Continent, the company is also enthusiastic about the rapid set-up of the Di-Acro Punch Press and other Di-Acro Equipment.



At DeVorn Displays in Cleveland, Ohio time plays an important factor in profitable production. "With each job estimated on a basis of minutes in production, machinery must be accurate, trouble-free and simple to setup and operate. That's why we're using Di-Acro Metalworking Machines," said a company spokesman. ■ DeVorn produces custom point of purchase displays, work that is often done on a tight deadline. With their No. 2 Di-Acro Punch Press they can set up rapidly and accurately for short run production. ■ Another time saving factor is the low maintenance required on their Die-less Duplicating Machines. "Other than periodic lubrication and cleaning, they required no maintenance."

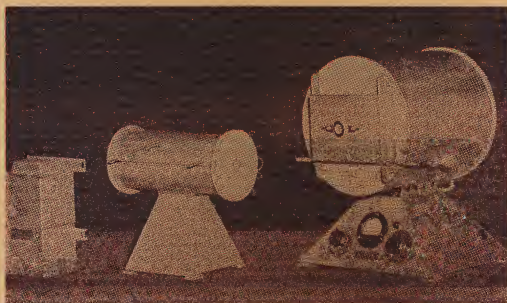
The Die-less Duplicating Concept

WITH DI-ACRO
PUNCH PRESSES

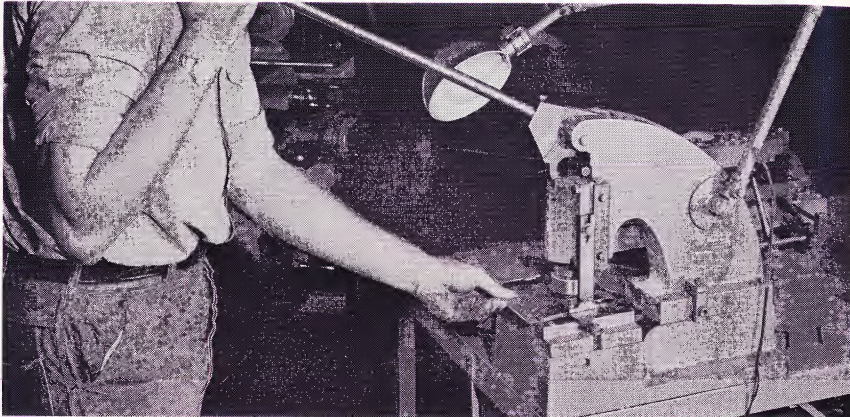


Small, compact hand operated Di-Acro Punch Presses offer you all the advantages of larger power production models at a fraction of the cost yet can give you both speed and accuracy.

Three different types are available — Single Station, Turret and Horn Presses — each designed to meet specific punching requirements, each highly versatile and equally useful whether it's in the experimental department, machine shop or production line. Over 500 different types of punches and dies are available from Di-Acro stock to fit all punch presses. Many standard stocked "special" shaped punch and die sets are available too.

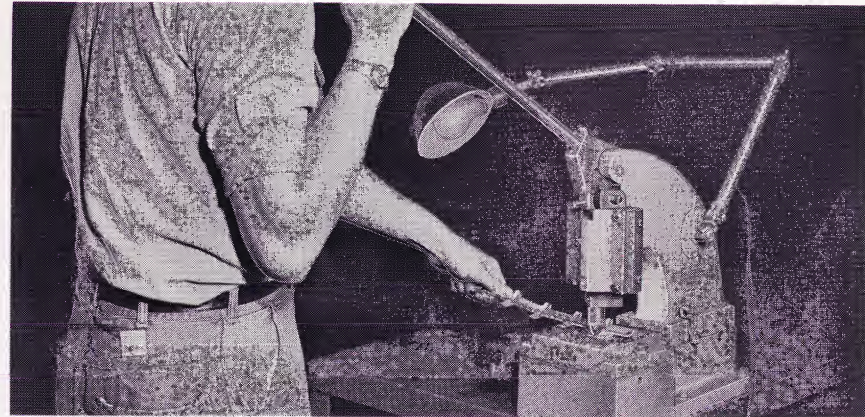


Hevi-Duty Electric Company of Milwaukee uses a 12 Station Di-Acro Turret Punch Press for production of small laboratory furnaces. Together with two other Di-Acro Die-less Duplicating Machines, the Turret Punch Press helps form a finished part every ten minutes. ■ Hevi-Duty found that, because of the rapid setup possible with Di-Acro Equipment, they could fabricate their own component parts rather than purchasing them from an outside source. With many pieces requiring more than one size hole per blank, a Di-Acro Turret Punch Press turned out to be a profitable answer on short run production. Many different components can often be punched without changing punches and dies.



Die-less Duplicating helps Foley Manufacturing Company of Minneapolis speed production in their experimental department. Using a No. 1 Di-Acro Punch Press in conjunction with other Di-Acro Equipment, Foley turns out experimental and special parts for their line of automatic saw filers, setters, retouchers and grinders as well as lawn mowers and kitchen utensils.

■ Because of the rapid setup and accuracy of Die-less Duplicating Machines, Foley is able to speed new parts and developments into production, cutting costs and time required for producing new innovations.

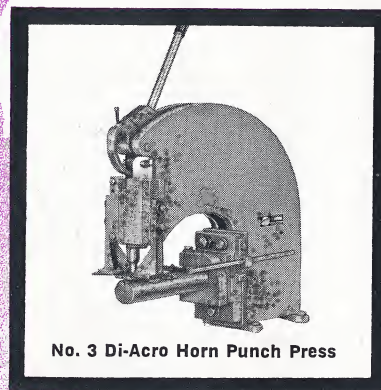


A No. 1 Di-Acro Punch Press has proven to be one of the most versatile machines in the Die-less Duplicating line for Foley. In the photo above, a slug of Cerro Matrix, a fairly hard but low melting temperature alloy, has been poured into the die holder opening and allowed to set around a punch specially made for the job. The forming die thus produced is being used to form sample rotary lawn mower blades of 14 gauge cold rolled steel. With a little heat, the "die" can be reshaped to form the next piece. Through this process, many intricate operations usually requiring larger, more complicated equipment can be performed.

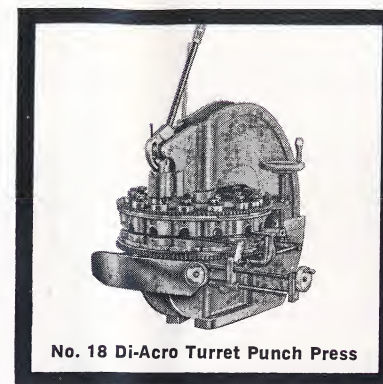
Punching, drawing and forming operations are all performed on Di-Acro Punch Presses at the Zenith Radio Corporation, Chicago. ■ For work in the model shop, Zenith demands, and gets, accuracy to within plus or minus .002" from their four Di-Acro Punch Presses. ■ Because many components are small and custom made, the rapid setup and versatility of Di-Acro Machines has proven to be a real boon to Zenith.



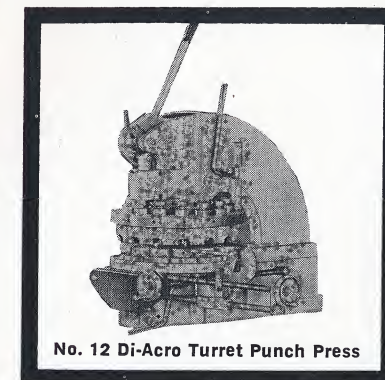
Both production runs and experimental work are performed on a No. 2 Di-Acro Punch Press at Wilcox Electric Company of Kansas City, Missouri. ■ Easy, rapid setup makes these machines ideal for experimental work, while repeated accuracy and ease of operation make them useful for short production runs. Rapid punch and die changes possible with their Di-Acro Punch Press have proven valuable to Wilcox in chassis requiring a wide variety of hole sizes and shapes.



No. 3 Di-Acro Horn Punch Press



No. 18 Di-Acro Turret Punch Press



No. 12 Di-Acro Turret Punch Press

Di-Acro Punch Press Models

SINGLE STATION PUNCH PRESS—A multi-purpose precision machine which perforates holes of various sizes and shapes — up to 4 inches in 16 gauge steel — rapidly and efficiently. Used also for an unlimited variety of blanking, drawing, embossing and forming operations.

Has turret stripper with four stations that can be rapidly positioned for stripping the material from any size punch within its capacity.

Adjustable side and back gauges allow precision gauging for exacting duplicating operations.

Perfect alignment of the punch head is assured at all times by a triangular shaped ram which is hardened and precision ground. Roller cam provides tremendous pressure at the point of impact.

TURRET PUNCH PRESSES—Available in twelve and eighteen station models. These highly versatile units enable the operator to rapidly punch a wide variety of round or irregularly shaped holes (1/16" to 2" diameter) in sheet material with a twirl of the turrets.

Designed for use in model shops and for short run production. Press can be equipped with Micro-Twin front operated micrometer type back and side gauges (an accessory).

Close tolerances are maintained because of the positive alignment between punches and dies. You can punch burr-free holes in the thinnest material.

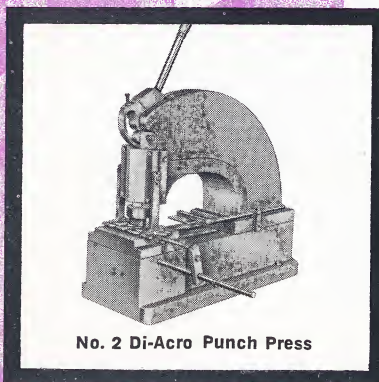
Turrets rotate independently on twelve station Models and simultaneously on eighteen station Models. All stations in the turret are numerically marked to prevent the possibility of misalignment.

HORN PUNCH PRESS—Designed especially for punching odd shaped parts and curved sections without distortion or preformed items that cannot be punched on a flat surface. Doubly versatile, can also be used as a regular Punch Press by installing special work table.

Roller cam provides tremendous pressure with minimum operator effort. Triangular ram, hardened and precision ground, assures perfect alignment. Capacity two inches in 16 gauge steel, four station turret stripper positions rapidly for stripping material of any size within the presses' capacity.

Horns are available in standard sizes from stock. Special sizes can be made at slight extra cost.

Work table has a machined surface and is equipped with gauges that quickly adjust from one setting to another. Quick change die holder (standard equipment) speeds changing of dies as it is not necessary to remove die holder from Machine and realign dies.



No. 2 Di-Acro Punch Press

SPECIFICATIONS — DI-ACRO SINGLE STATION PUNCH PRESSES

Model	No. 1	No. 2
Depth of Throat	6"	12"
Rated Capacity	4 tons	4 tons
Height of Throat	3"	3"
Stroke	5/8"	5/8"
Hole in Ram (Dia.)	1"	1"
Bed Dimensions	6"x7 1/2"	6"x7 1/2"
Slug Waste Hole	4 1/4"x5 3/4"	4 1/4"x5 3/4"
Floor Space (on stand)	15"x17"	15"x26"
Weight lbs., Net	170	340
Shipping	186	364
Export	200	400
Price	\$235.00	\$325.00
STAND	\$55.00	\$57.50
Stand weight lbs., Net	95	127
Shipping	100	135
Export	140	175

MATERIAL CAPACITY: 4 in. dia. hole in 16 gauge mild steel (.062"), 1/4-in. hole in 3/8-in. steel plate. Other material accordingly.

■ STANDARD EQUIPMENT

Standard equipment includes turret stripper, punch holder for punches with 1/2" dia. shank, die holder, short and long handle.

SPECIFICATIONS — DI-ACRO TURRET PUNCH PRESSES

Model	No. 12	No. 18
Capacity	4 tons	4 tons
Depth of Throat	12"	18"
Maximum Punch Diameter	2"	2"
Clearance between Dies and Stripping Surface	3/4"	3/4"
Stroke of Ram	5/8"	5/8"
Floor Space (on stand)	28"x30"	34"x36"
Weight lbs., Net	460	875
Shipping	485	1000
Export	520	1150
Price (w/o punches & dies)	\$745.00	\$995.00
Micro-Twin micrometer gauges	95.00	95.00
STAND	\$55.00	\$70.00
Stand wt. lbs., Net	130	128
Shipping	135	133
Export	165	163

MATERIAL CAPACITY: 2-in. dia. hole in 16 gauge mild steel (.062"), 1/4-in. hole in 3/8-in. steel plate. Other material accordingly.

■ STANDARD EQUIPMENT

Standard equipment includes, Stripper Plate for each punch unit, short and long operating handle.

SPECIFICATIONS — DI-ACRO HORN PUNCH PRESS

Model	No. 3
Capacity	4 tons
Depth of throat with horn	7 3/4"
Depth of throat with table	9 3/4"
Size of work table	18"x24"
Stroke of ram	5/8"
Capacity with table, 16 ga. mild steel	2"
Horn A — 2" diameter, capacity 16 ga. mild steel	3/4"
Horn B — 2 7/8" diameter, capacity 16 ga. mild steel	1 1/8"
Horn C — 3 7/8" diameter, capacity 16 ga. mild steel	2"
Price*	\$150.00
*(Above price includes frame, ram assembly, punch holder and two operating handles.) Refer below for price of proper size horn, table attachments and other accessories.	
ACCESSORIES	
Quick Change Die Holder and Bolster	\$65.00
Work Table with Gauges for above Die Holder	35.00
Horn Adapter	35.00
Stripper Arm Turrets and Plate	17.50
Die Adapter A 2 3/4" O.D. x 1 1/4" I.D.	5.00
Die Adapter B 2 3/4" O.D. x 2 1/8" I.D.	5.00
Back Gauge	5.00
Horn A (2" diameter)	35.00
Horn B (2 7/8" diameter)	45.00
Horn C (3 7/8" diameter)	55.00
Stand	57.50
Stand Weight lbs., Net 127, Shipping 135, Export 175	

■ 44-PAGE PUNCHING CATALOG

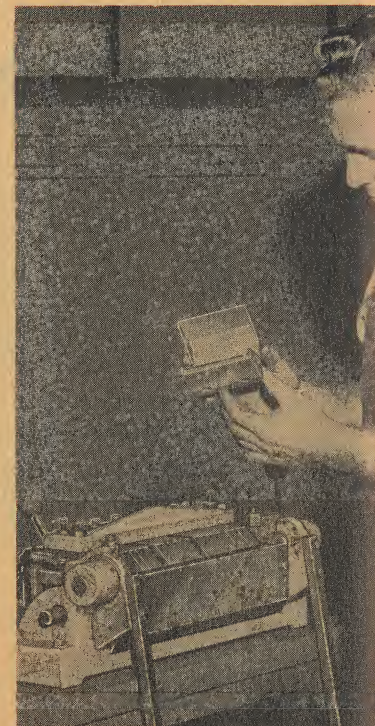
"A Look at the Art of Punching" features Stylus Operated Turret Punch Press, describes various punching processes and concepts — Turret, Single Station and Adjustable. Lists over 500 punches and dies, plus many specials available "off the shelf" for immediate delivery. Write for your copy today.



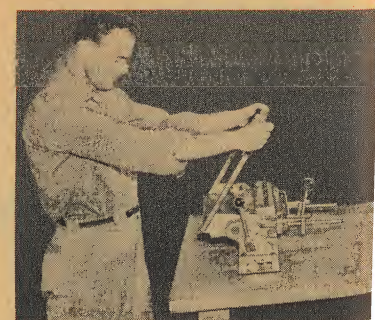


Complex shapes and bends are formed on the Di-Acro Brake in the experimental department of Foley Manufacturing Company, Minneapolis. Along with many other pieces of Di-Acro Die-less Duplicating Equipment, Foley uses a Brake for experimental forming purposes as well as for forming small component parts. ■ Complicated parts can be made to exacting tolerances on Di-Acro Equipment. With tolerances held so close on models, Foley saves time in setting up larger machines for full scale production runs.

Tolerances of plus or minus $1/64$ " must be held on parts for a coaxial cable splicing kit manufactured by Dittmore-Freimuth Manufacturing Company, Milwaukee. ■ For precision work like this, the answer was a 12" Di-Acro Finger Brake. Large floor-type brakes were considered impractical because of the accuracy required. Also, with the use of the Di-Acro Brake for this job, the floor brake was left free for other work. Rapid adjustment of the Di-Acro Brake makes possible a wide variety of forming operations, all held to the same precise tolerance. ■ The coaxial splicing kit is designed to allow inexperienced personnel to make a splice in coaxial cable. In this operation, the splice must be accurate to reproduce the qualities of an unbroken cable. When the operation of the finished product is so critical, it is important that all operations going into it be equally critical. It is in work like this that Die-less Duplicating provides the most accurate, economical solution in many cases. The parts formed by D-F on their Di-Acro Brake are formed from 16 gauge steel to withstand rugged operation in the field.



■ American Bank Equipment Co., Philadelphia, Pennsylvania holds tolerances of plus or minus .002" using a 12-inch Di-Acro Box Finger Brake. On short production runs, the Brake, along with other Die-less Duplicating Equipment, helps American cut costs and maintain high quality standards. The savings afforded by Di-Acro Equipment rank high with American. A company spokesman said "With Di-Acro Equipment we save over half of what we have paid on the outside."





Stainless steel up to 16 gauge is formed by Pako Corporation of Minneapolis on their Di-Acro Brake. Stainless is used on Pako's many film processing machines because of its resistance to corrosion and chemical wear. ■ The setup shown above is used to form panel clips for Pako's X-ray Filmachine. An open end finger is used to form the closed shape of the clip. Because of the versatility of the Di-Acro Brake, it is used to speed many short production run operations which might otherwise tie up a more expensive piece of machinery. Open end fingers allow enclosed shapes to be formed as easily as simple bends on the Brake.

The Die-less Duplicating Concept

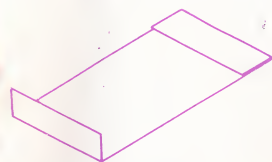
WITH DI-ACRO
BRAKES



The problem of forming miniaturized parts from sheet material has been solved for many manufacturers by using the No. 1 Di-Acro Brake with a maximum forming width of only 6 inches. This precision forming Machine, as well as the highly versatile 12 and 24 inch Di-Acro Brakes, offers Die-less Duplicating unlimited, as one model can be set up to perform the function of six different machines — a standard brake, bar folder, box and pan brake, open end former, tab former, and radius former.

All types of ductile sheet material up to 16 gauge mild steel can be formed on these Machines. Their accuracy and fast set up make them ideal for both experimental and production runs.

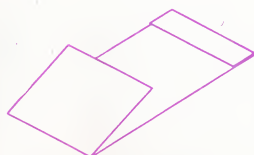
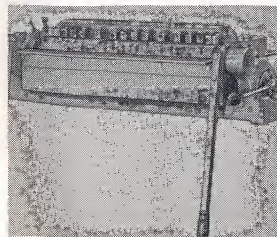
DI-ACRO LEAF TYPE BRAKE SIX MACHINES IN ONE!



■ STANDARD BRAKE

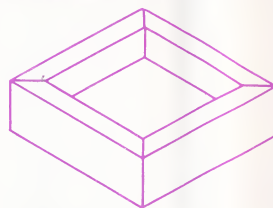
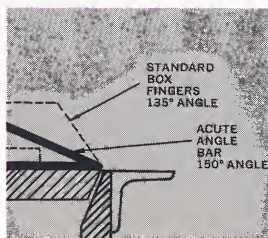
With all box fingers in position across the full width of the brake, you obtain the action of a standard folding brake. Up to 16 gauge steel can be formed in any angle up to 135 degrees. Reverse bends can be made within $\frac{1}{4}$ inch of each other on Models 12 and 24, $\frac{1}{8}$ inch on Model No. 1. Single or double hems can be made.

When the removeable box finger feature is not desired, the Brake can be equipped with a standard forming bar. Maximum bend with the standard forming bar is 120 degrees on the Model 1 and 135 degrees on Models 12, 24.



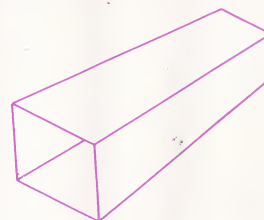
■ BAR FOLDER

Angles up to 150 degrees can be formed with an acute angle bar (accessory). This greater angle also eases the flattening operation in hemming heavier materials. Forming bars with angles greater than 150 degrees can be made on special order.



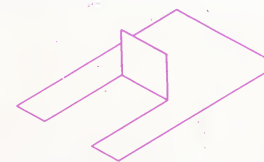
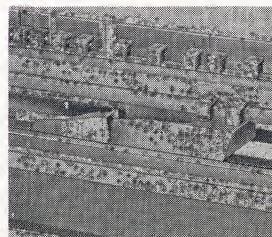
■ BOX AND PAN BRAKE

Box fingers ranging in width from $\frac{3}{4}$ inch to 6 inches on Models 12 and 24 permit any width of box or pan within the capacity of the machine to be formed. Minimum width is $\frac{3}{4}$ inch and maximum width is 24 inches (Model 24) with the distance between covered in $\frac{1}{4}$ inch steps. Box fingers on 12 and 24 Models are undercut and up to a $\frac{1}{2}$ inch lip or flange can be formed. Photo below shows such a lip or flange on a box that is formed with extension fingers (accessory). Model No. 1 has box fingers ranging from $\frac{1}{2}$ inch without undercut feature.



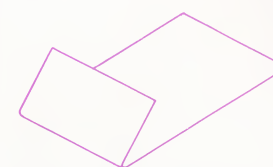
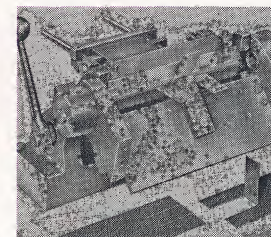
■ OPEN END FINGER

Triangular, square and rectangular closed shapes can be formed with an open end finger accessory. The parts can entirely enclose the forming attachment, yet slip off easily over the open end when completed. Maximum forming width of the open end fingers is 4 inches on the Model 1, 6 inches on the Model 12 and 9 inches on the Model 24. Material capacity depends on type of material, size and degree of bend. Easily mounted on the finger mount bar by removing the standard box fingers.



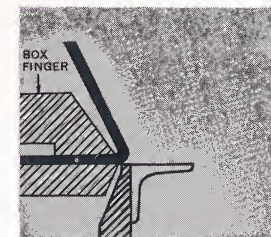
■ TAB FORMER

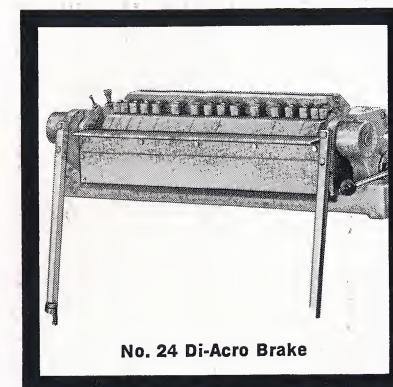
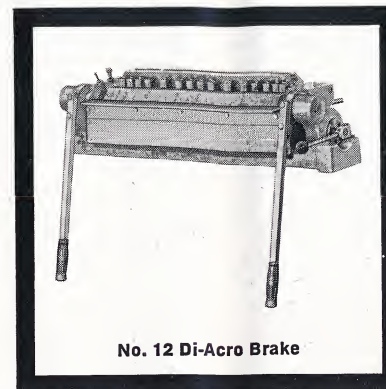
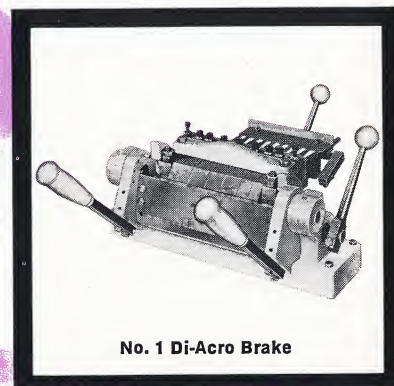
Forming a tab on a part without disturbing the material on either side is easily done with a block mounting blade (accessory). It has numerous tapped holes allowing one or a series of bending blocks to be mounted for production of special parts. Bending blocks can be made to your specifications or in your own plant.



■ RADIUS FORMER

Radius bends can be formed in two ways; 1, by moving the forming bar back from the centerline which will allow material to form its own natural radius; 2, by replacing the forming bar with a radius bar. Radius bars are available in $\frac{1}{8}$ inch or $\frac{1}{4}$ inch radii (Models 12 and 24 only). The possibility of fracturing low ductile material is greatly reduced. Also, the crystallization of material during centerline radius forming is reduced because the bending stress is distributed evenly over the entire forming area.



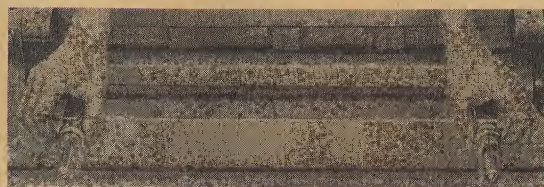


Di-Acro Brake Models

Di-Acro precision Brakes are available in 3 models. Each is basically the same in operating characteristics, each model designed to best perform specific functions. They are ruggedly constructed, portable and are equally useful in prototype work and production runs.

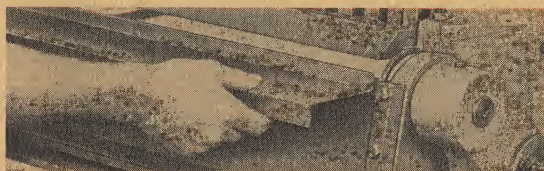
Di-Acro Brake No. 1 is especially designed for high speed forming of miniature parts. Material is securely locked in place during the forming operation and quickly releases for removal. Degree of bend is positively controlled by adjustable stops and adjustomatic gauge quickly sets depth of bend for exact duplication. A folding blade is included as standard equipment with a wide edge for normal forming operations and a narrow edge for close reverse bends.

No. 12 and 24 Di-Acro Brakes are identical in construction, the only difference being the additional forming width of the Model 24. Both feature undercut fingers and 1 inch clearance through top opening, making them ideal for forming boxes, chassis and panels with up to 1/2 inch lip or flange across top or bottom. Quik-set micrometer back gauges included as standard equipment insure accurate forming whether in prototype work or on the production line.



Top photo shows easy to adjust and read micrometer gauges. One revolution of each micrometer dial moves gauge 1/10 inch. Dial can be disengaged from lead screw for rapid adjustments. Maximum gauge range is twelve inches. Quik-set gauge is standard on Models 12 and 24 Di-Acro Box Finger Brakes only.

Undercut Box Fingers and one inch opening through top shown in bottom photo are specially designed for forming electrical and electronic chassis, cabinets, panels, etc., with up to 1/2 inch lip across top or bottom. Models 12, 24 only.



SPECIFICATIONS — DI-ACRO BRAKES

Models	No. 1	No. 12	No. 24
Maximum Forming Width	6"	12"	24"
Material Capacity — Mild Steel	16 ga.	16 ga.	16 ga.
Clearance Through Top Opening	1/8"	1"	1"
Undercut Box Fingers (for forming boxes with lipped or flanged edges)	none	1/2"	1/2"
Maximum Depth of Box or Pan	2"	3"	3"
Minimum Reverse Bends	1/8"	1/4"	1/4"
Maximum Angle (one operation)	135°	135°	135°
Back Gauge Adjustment (can be increased)	12"	12"	12"
Floor Space	15"x14"	24"x15"	38"x15"
Weight lbs.: Net	65	130	300
Shipping	70	145	335
Export	85	160	350
Price, Brake with Box Finger Assembly	\$165.00	\$275.00	\$425.00
Price, Brake with Standard Forming Bar	135.00	235.00	375.00
Price, Brake with Acute Angle Bar	140.00	240.00	380.00
Stand	55.00	60.00	65.00
Stand Weight lbs.: Net	86	96	114
Shipping	89	100	116
Export	126	116	139

ACCESSORIES

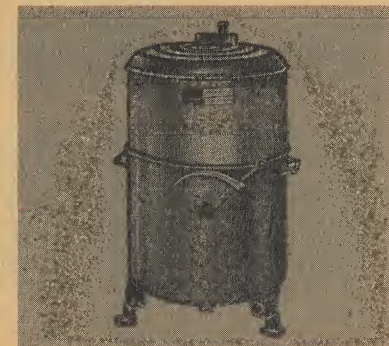
Models	No. 1	No. 12	No. 24
Standard Forming Bar	\$25.00	\$75.00	\$125.00
Box Finger Bar Assembly (complete)	55.00	115.00	175.00
Acute Angle Bar — 18 ga. capacity	30.00	80.00	130.00
Open End Finger	15.00	20.00	27.50
Extension Fingers (pair R and L)	...	20.00	20.00
Extra Box Fingers to 1 1/4" ea.	all sizes \$3.50 ea.	\$7.00	\$7.00
to 3" ea.	....	10.00	10.00
to 6" ea.	....	15.00	15.00
Block Mounting Blade	\$10.00	15.00	25.00
Radius Box Finger, Complete (specify desired radius)	....	\$70.00	\$110.00
Complete set includes 2 — 3/4"; 2 — 1"; 2 — 1 1/4"; 2 — 3". The complete set listed is for the No. 12 Box Finger Brake. For No. 24 Brake, 2 — 6" additional required.			
Extra Radius Box Fingers to 1 1/4" ea.	....	\$7.50	\$7.50
to 3" ea.	....	12.50	12.50
to 6" ea.	....	20.00	20.00
Radius Extension Fingers (pair R and L)	....	25.00	25.00
Available in 1/4" or 1/8" radius (specify desired radius)			
Quik-Set Micrometer Gauge purchased separately	....	40.00	55.00



Two Di-Acro Rod Parters have replaced a screw machine at Jari Products, Inc., of Minneapolis, Minnesota to save time and reduce production costs. ■ Jari uses both a No. 1 and a No. 2 Rod Parter to part off round, square and hex steel rods. The former method of cutting on a screw machine was not only time consuming, but often tied up a machine which could have been used in other production. ■ An innovation made by Jari to speed operation on their hand operated Rod Parters is to mount them in an inclinable Punch Press. By using a Di-Acro Rod Parter, Jari has eliminated the burring of rod stock completely. After parting, the rod can be inserted in a hole of its same diameter and the end threaded or riveted without further processing. On all rod parting operations, tolerances of plus or minus .01" are easily maintained. ■ Jari manufactures powered sickle bar mowers with attachments for tilling, cultivating and throwing snow.



Holding tolerances of plus or minus $\frac{1}{16}$ ", Brock Laundry Machine Company, Toledo, Ohio has had a Di-Acro Rod Parter in operation for over five years. ■ Brock reports that the Rod Parter is faster and easier than any other method.



The moisture extractor pictured above is manufactured by Brock using a Di-Acro Rod Parter. Because of the burr-free cut given, the Rod Parter eliminates finishing and de-burring steps on bar stock before threading or welding.



Thompson Products, Inc., of Cleveland, Ohio "parts off" round stock to close tolerances using a Di-Acro Rod Parter. ■ The company produces a variety of small and medium size parts on a short run, intermittent interval basis. On all operations the Rod Parter is run at production speeds, providing a distortion free cut which can be formed without an intermediate operation.



Butt welding of wire was simplified for the Universal Spring Wire Company of Bedford, Ohio, by use of a Di-Acro Rod Parter. The square, burr-free cut made by the Rod Parter proved to be a tremendous aid in this operation. ■ A solid weld of two ends of wire rolls eliminated the time consuming job of reloading Universal's automatic spring forming machine. ■ For any operation requiring a square, clean "part" of bar stock, Di-Acro has the answer in its hand operated Rod Parters.

The Die-less Duplicating Concept

WITH DI-ACRO
ROD PARTERS

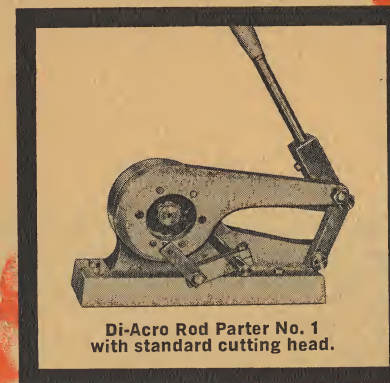


Die-less Duplicating is not restricted to the Di-Acro Machines working with sheet material. It applies also to the Di-Acro Rod Parter when used by itself or as a companion in preparing materials for the Di-Acro Bender. The Machine is equally useful whether just a few pieces or production quantities of bar stock are to be cut as the only set up required is to adjust for material length. In addition, the Di-Acro Rod Parter usually eliminates a processing step as the bar stock is cut clean — without rough edges or burr.

Cutting bar stock without distortion, rough edges or burr is one of the many features of the Di-Acro Rod Parter.

As shown in the photo, stock is fed through two cutting heads and is closely confined. One cutting head is stationary, the other moves in response to a pull on the operating handle. Special head moves just enough to start a shearing action. Once a cut has been made in confined material the rest of the rod breaks off, eliminating any rough edges or burr. Hard materials such as cold rolled steel and hard aluminum have excellent "parting" action. Hot rolled tends to "mush" or egg shape slightly but in most cases is satisfactorily parted.

Cutting heads are made of alloy steel, hardened and ground for long wear and accuracy. Heads are reversible for double service, easily removed for sharpening or replacement. The powerful multiple leverage arrangement, exclusive to this machine, provides exceptional ease of operation. Cutting heads of Di-Acro Rod Parter No. 1 have 11 holes graduated in size from $\frac{1}{16}$ in. to $\frac{3}{8}$ in. diameter in steps of $\frac{1}{32}$ in. There are 10 holes from $\frac{1}{16}$ in. to $\frac{5}{8}$ in. diameter graduated by $\frac{1}{16}$ in. in Di-Acro Rod Parter No. 2. All holes are approximately .003" oversize, .015" oversize holes are required for hot rolled stock.

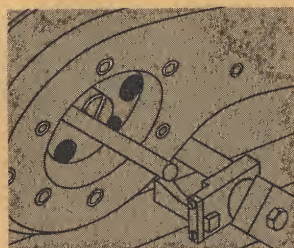


Di-Acro Rod Parter No. 1
with standard cutting head.

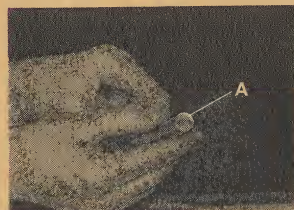


Di-Acro Rod Parter No. 2
with cutting head
for shaped stock.

Di-Acro Rod Parter Models



Ejectomatic gauge enables automatic gauging, parting, and ejecting of stock in a single working cycle. Especially valuable when cutting lengths under six inches.



Material sheared to Point A. Then breaks off. No rough edges or burr.

SPECIFICATIONS — DI-ACRO ROD PARTERS

Models	No. 1	No. 2
Maximum Material Capacity, steel bar	$\frac{3}{8}$ "	$\frac{5}{8}$ "
Cutting Head Thickness	$\frac{1}{2}$ "	1"
Bench space required with gauge	9 $\frac{1}{2}$ "x21 $\frac{1}{2}$ "	16"x32"
Weight lbs., Net	25	60
Shipping	28	78
Export	35	82
Price, including Ejectomatic Gauge	\$110.00	\$165.00
Extra Standard Rod Parter Heads (pr.)	46.20	55.00
Irregular Shaped Holes (each)	45.00	45.00

STANDARD EQUIPMENT

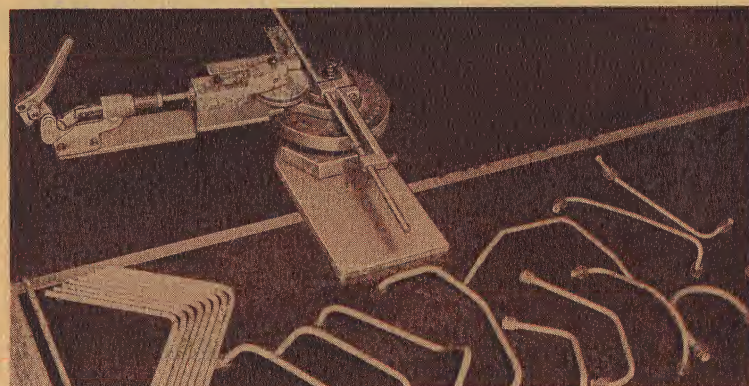
Ejectomatic Gauge, two operating handles.

NOTE: Standard dies in all Rod Parters are for parting round cold finished steel bar stock. If hot rolled bar stock is to be parted, specify this on order as an optional set of die heads (holes approximately .015" oversize) is available. Special cutting heads can be furnished on separate quotation for square, rectangular, hexagonal and other shaped stock or with cutting holes in just about any size combination within the capacity of the machine.

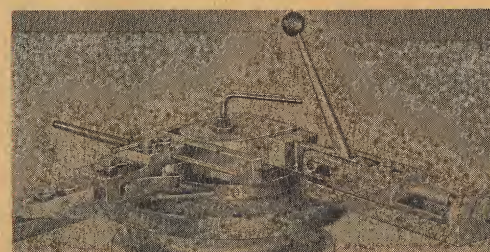
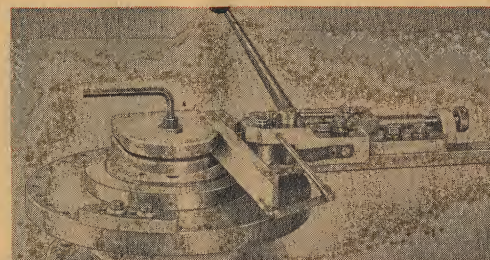
Power Models are also available. For complete information write for catalog.



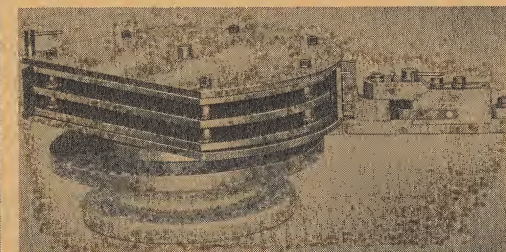
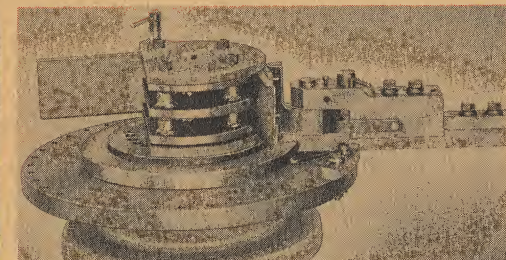
Round, square, rectangular or
hex bar stock can be parted.



Di-Acro Benders have proven indispensable to Cornelius Manufacturing Company in making air compressors to rigid government specifications. ■ In bending anodized tubing for compressor units to meet government specs, force fitting is forbidden and there can be no marring or damage to the outer wall of the tubing. To meet these specifications, this Minneapolis firm has depended on their Di-Acro Bender for over 15 years. ■ Intricate, multiple bends are formed to close tolerances. Because of the fast setup and all around versatility, Di-Acro Benders serve a twofold purpose at Cornelius. Experimental parts are formed as well as production runs up to 500 pieces. According to a Cornelius spokesman, their Di-Acro Benders have proven to be the most versatile machines in the plant.



Applications for Di-Acro Benders are almost unlimited, as the above photos show. In the top left photo, special tooling has been designed to permit bending of two pieces of $\frac{1}{2}$ " x 1" aluminum angle in one operation. ■ The lower left photo shows the bend completed with material in place.



At top right, 20 gauge steel channel with $\frac{1}{2}$ " legs is being formed with the legs in. Because of the size of the radius, the radius collar has a built-in locking device to hold the material. Lower right shows a similar operation with a larger 15" radius collar being used.



Republic Aviation Corporation uses four Di-Acro Benders to form small radius bends on intricate airplane parts. The Di-Acro Machines replaced the former method of forming on a folder with special setups. ■ Rapid tooling changes mean that Republic can turn out a wide variety of parts with a minimum downtime between operations. Republic reports substantial savings in setup time with the Benders. In one operation, bending strips of .020" to .025" soft temper steel, a Di-Acro Bender turns out forty pieces per hour on a regular production basis. In addition to forming special small parts, Republic uses their Di-Acro Die-less Duplicating Equipment for experimental work in development of pilot models, saving the work of making special jigs for this type of job. On this experimental work, the accuracy of their Bender has meant substantial savings to Republic.

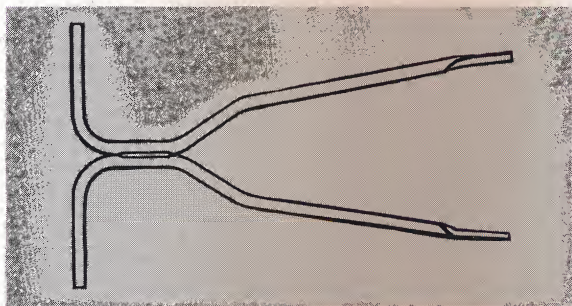
The Die-less Duplicating Concept

WITH DI-ACRO
BENDERS

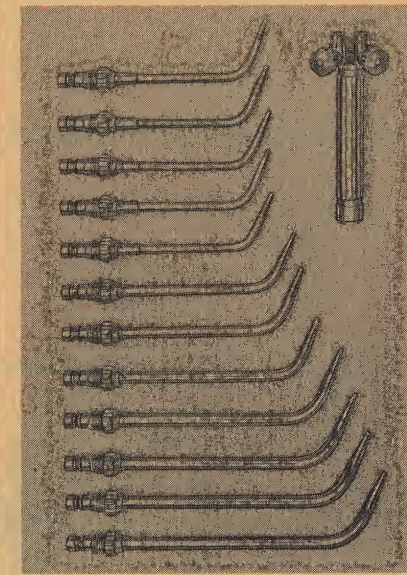
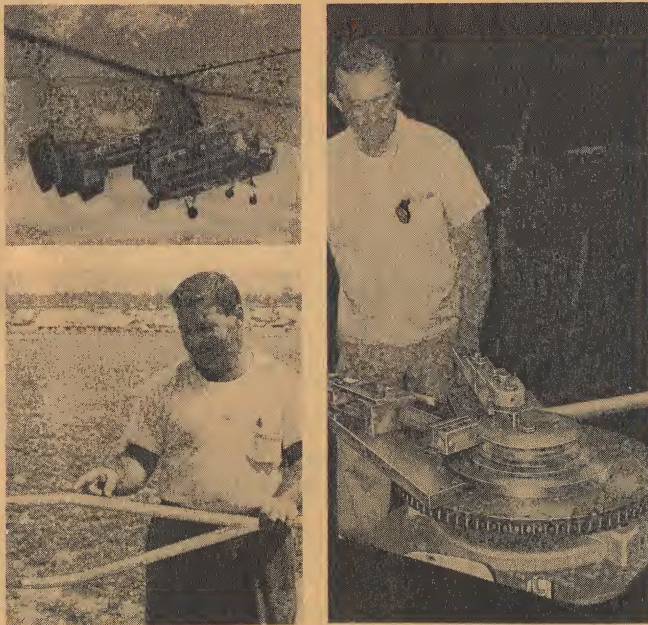


Perhaps your forming problem is in the model shop where you need to duplicate just a few pieces of bar stock for a prototype. Or, maybe it's a production run of parts in tubing, flat stock or channel material requiring compound bends. Whatever the forming problem, each one of these jobs plus many, many others can be handled on a single Di-Acro Bender. All that's required is an occasional drop of oil and mountains of stock. You can duplicate any bend to thousandths of an inch, long run or short. Shift after shift, year after year. This is Die-less Duplicating at its best. It has been highly successful for others, and it can be for you, too.

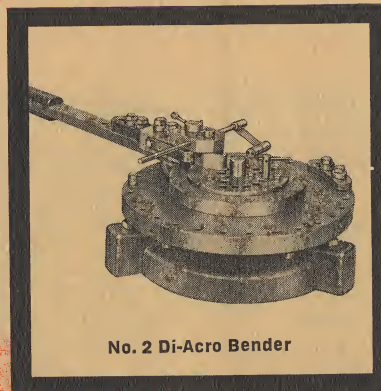
By pre-plating lawn mower handles, Foley Manufacturing Company of Minneapolis chalked up substantial savings and storage space and handling time using a Di-Acro Bender. ■ "Pre-plating is feasible with Di-Acro Benders because their gripping jaws do not damage the finish," said a Foley spokesman. "This saves us 33% in storage space and at least 50% in handling time." The Foley bending operation involves 18 gauge steel tubing up to $\frac{7}{8}$ inch O.D. ■ Foley uses a hand operated Di-Acro Bender in their model shop. They chose Di-Acro because of the fast setup and repeat accuracy. On the floor of their shop, Foley has a Di-Acro Power Bender with which they can duplicate the work turned out on the hand machine at greater speeds, often using the same tooling. A Foley spokesman describes this as, "a handy arrangement."



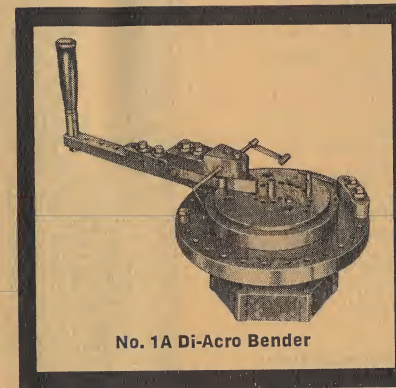
Kaman Aircraft Corporation found that with their Di-Acro Bender they could produce duplicate parts for experimental purposes. This has proven to be important in cases where experimental work may take years and require the construction of many prototypes. ■ Using a No. 4 Di-Acro Bender, Kaman produces parts in a wide variety of materials to standard aircraft tolerances. The Di-Acro Machine replaced hand and mandrel forming methods that required heating of the material and often resulted in distortion. ■ Kaman chose the No. 4 Bender with its ratchet power multiplying action because of forming requirements that included up to 1½" tubing and ¼" steel plate. Photos below show the No. 4 Bender at work in Kaman's Bloomfield, Connecticut plant.



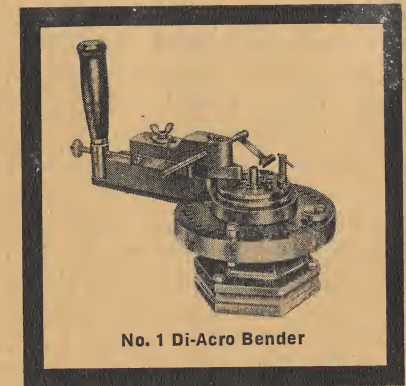
The characteristic curvature of welding and cutting tips is formed on a Di-Acro Bender No. 3 at Tescom, Inc., Minneapolis, Minnesota. ■ Using a solid copper rod stock that has been drilled for gas and air passages and tapered by a swagging operation, the tips are formed without distortion to internal air passages. On the bending operation, tolerances of .003" to .010" must be maintained to insure accurate direction of flame cutting. ■ Tips, used for cutting rivets, are flat on one side to allow operators to rest the cutting tip on material. The bend of the tip determines the direction of the flame which burns only the rivet head without damage to other material. For this operation an accurate radius on a flat plane must be obtained. ■ Soldering tips made from SC-52-3 drilled copper rod along with some brass tubing are also shaped on the Di-Acro Bender according to a Tescom spokesman. Thicknesses on tubing average .065". Valve control levers for cutting heads are also formed on the same machine from ¼" stainless steel rod stock. ■ The Tescom plant has made their own special tooling for their Bender which is used for a number of short run production jobs and for special pieces that are needed rapidly for pilot work. The fast setup time on the Bender has speeded up production in the years that the machine has been in operation. Former methods of bending tips by using a bench vise and a hollow pipe had proven too slow to keep up with production demands and lacking in necessary accuracy.



No. 2 Di-Acro Bender



No. 1A Di-Acro Bender



No. 1 Di-Acro Bender



No. 3 Di-Acro Bender



No. 4 Di-Acro Bender

Di-Acro Bender Models

Five hand operated Di-Acro Benders are available with material capacities from $\frac{1}{16}$ inch wire to 1 inch round steel bar and equivalent, and radius forming possibilities up to 12 inches. Each is identical in design, construction and operating characteristics with sufficient additional strength built into each successfully larger unit to adequately cover its greater material and radius forming capacity. In addition the No. 4 Di-Acro Bender features a ratchet mechanism which greatly increases forming power when working with heavy materials. For speed in working light materials, ratchet can be disengaged and Bender operated on direct drive.

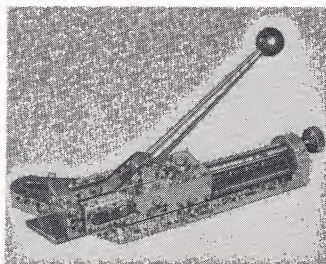
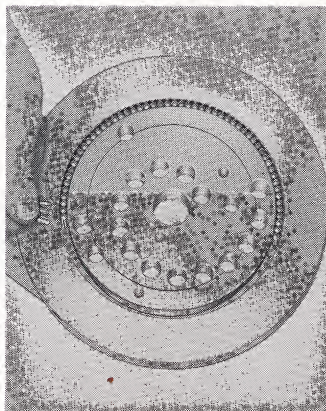
As shown in the photo each Di-Acro Bender is equipped with a ring of needle bearings to provide smooth, friction-free forming. Less effort required in bending means lower operator fatigue, higher production, closer tolerances and less wasted time and material. And there are other ingredients that spell high quality and acceptance. Heavy castings, precision machining, and accurate performance add up to a Bender that will give years of accurate forming under heavy production loads with little or no maintenance.

DI-ACRO QUIK-LOK CLAMP

Available for all Di-Acro Benders, accessory is particularly valuable when bending tubing, angle, channel, and extrusions as it locks the material securely and can be instantly released for removal of the part.

32 PAGE BENDING MANUAL

Handy booklet describes and illustrates in step by step fashion over twenty different bending operations with over ninety diagrams and charts together with valuable tooling suggestions. Ask for catalog D-BM, no obligation.



SPECIFICATIONS — DI-ACRO BENDERS

Model	No. 1	No. 1A	No. 2	No. 3	No. 4
Radius Capacity	2"	6"	9"	12"	12"
Height of Std. Forming Nose	1/2"	3/4"	1"	1 1/2"	1 1/2"
Built-up Nose available	1"	2"	3"	4"	4"
Center Pin Hole — dia.	3/8"	1/2"	1"	1"	1"
Operating Leverage	8"	16"	29"	40"	40"
Floor Space, on stand	15"x15"	32"x32"	56"x56"	82"x82"	78"x78"
Weight lbs; net	22	55	140	215	250
Shipping	25	75	165	300	330
Export	37	85	210	320	350
Price	\$95.00	\$165.00	\$235.00	\$315.00	\$475.00
Extension Handle	7.50	—	10.00	10.00	—
Quik-Lok Clamp with 1 Clamp Block	40.00	45.00	65.00	65.00	75.00
STAND	52.50	52.50	52.50	52.50	52.50
Weight lbs: Net 85, Shipping 90, Export 125					
MATERIAL CAPACITIES	No. 1	No. 1A	No. 2	No. 3	No. 4
Round Mild Steel Bar	3/16"	5/16"	1/2"	5/8"	1"
Square Mild Steel Bar	1/8"	1/4"	3/8"	1/2"	3/4"
Steel tubing — 16 gauge	3/16"	1/2"	3/4"	1"	1 1/4"
Standard Iron Pipe	—	—	3/8" IPS	1/2" IPS	1" IPS
Flat Steel Bar (bent flat)	1/8"x3/4"	3/16"x1"	1/4"x1 1/2"	1/4"x2"	3/8"x4"
Flat Steel Bar (Edgewise)	1/16"x1 1/2"	1/8"x1 1/2"	1/8"x3/4"	1/8"x1"	1/4"x1"
Angle	1/16"x1 1/2"x1 1/2"	1/8"x1 1/2"x1 1/2"	1/8"x3/4"x3/4"	1/8"x1"x1"	3/16"x1"x1"
Channel	1/16"x1/4"x1 1/2"	1/16"x1/2"x1 1/2"	1/8"x3/8"x3/4"	1/8"x1/2"x1"	3/16"x1/2"x1"

STANDARD EQUIPMENT

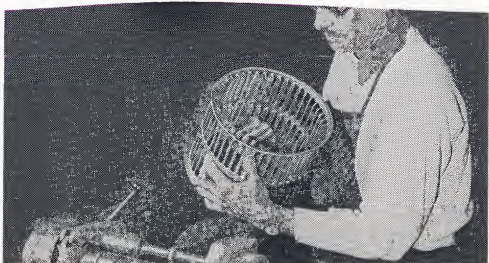
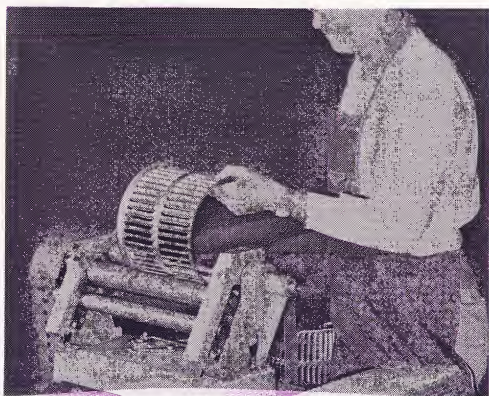
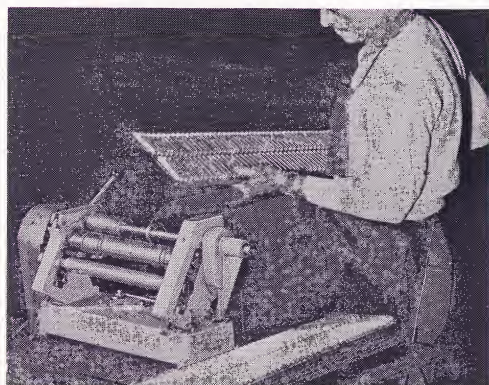
Bend Locating Gauge — setting this gauge allows any number of parts to be duplicated.

Angle Stop — locating this determines degree of bend.

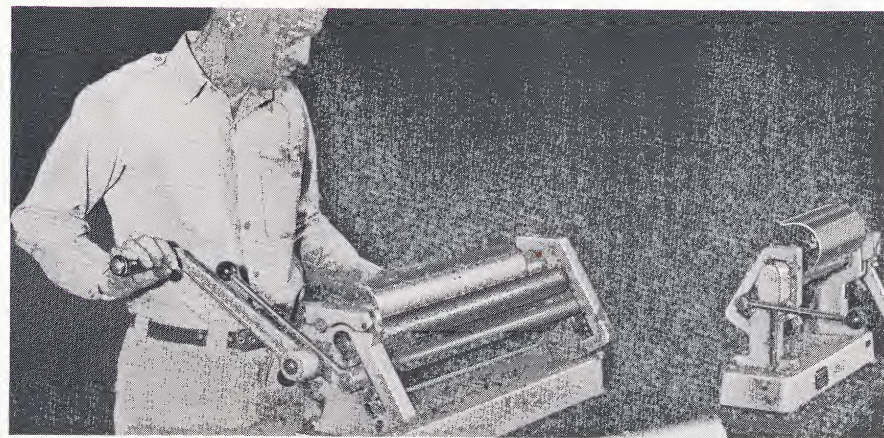
Locking Pin — adjusting this securely clamps material.

Center Pin — provides one radius setup plus mount for other tooling.

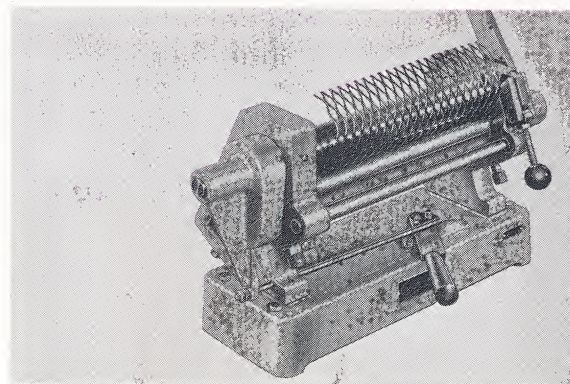
Di-Acro Benders are also available in Power Models. For complete information write for catalog.



Die-less Duplicating has increased production speed and substantially reduced costs for Morrison Products, Inc. of Cleveland, Ohio. Morrison manufactures components for heating and air conditioning equipment. In forming a "squirrel cage" type blower as shown at left, the old method required forming the stock sheet first and adding louvers later. This was a time-consuming and exacting operation. ■ By specially tooling a Di-Acro Roller, Morrison can now form the louvers in the flat stock, then roll it on the Roller. After the rolling operation, the blower is ready for welding with no further operations. The blower is rolled with flanges out and louvers to the inside. Both the top and bottom rolls of the Di-Acro Roller are grooved to accept the shaped blank. ■ Materials formed are galvanized and cold rolled sheet ranging in thickness from .022" to .028". The quick release lever allows easy removal of the finished piece to further speed production.



Versatile Di-Acro Rollers are used to form lamp shades at Marks Manufacturing Company of Chicago. Marks produces desk and bed lamps as well as decorative and utility lamps. ■ The Di-Acro Roller is used to form shades for fluorescent bulbs. Material formed is mostly 24 gauge steel, with tolerances held to within plus or minus $\frac{1}{32}$ " on all operations. Because of the calibrated roll position indicators, Marks can perform production runs and repeat runs with "die-accuracy" on their Rollers.



Expanded metal grills for the Tel-A-Story Projector are formed from 18 gauge metal on a Di-Acro Roller. ■ Tel-A-Story, Inc., of Davenport, Iowa, found that a Di-Acro Roller met their requirements for accuracy, holding all tolerances to within plus or minus .015", plus offering the advantage of fast setup. In addition, it was discovered that using a Roller required less labor than previous methods.

Forming either circles or shapes is easily accomplished on the Di-Acro Roller because of the exclusive cam actuated Idler Roll. Here's how:



Material is inserted with Idler Roll disengaged.



Material is then run through rollers to desired point and Idler Roll engaged.



Bend is continued until proper angle is formed.



Idler Roll disengaged and material rolled to next point.



Idler Roll engaged to make second bend.



Process repeated until shape is formed.



The Die-less Duplicating Concept

WITH DI-ACRO
ROLLERS

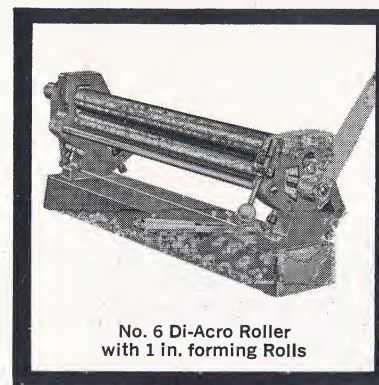
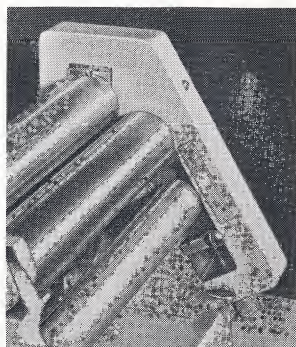


Making ends meet is simple with a Di-Acro Roller. First of all this Machine is equipped with a cam actuated idler roll that enables the operator to locate bends at any point on a sheet of material with straight sections on one or both sides of the bend.

Perfect circles can be formed on the Roller with no flat spots on leading edge of material. Small circles approximately the same diameter as the forming rolls can be produced in one operation. Circles of any diameter can be formed in just two passes through the rolls. Minimum radius is determined by the diameter of the rolls with no limitation as to maximum radius.

Round, flat, square and other ductile materials can be formed with a Di-Acro Roller too, simply by grooving the bending rolls to fit the shape of the material.

A versatile forming machine easily set up for experimental and production operation in sheet material, small wire and rod stock. Available in hand operated models with a forming width of only 6 in. for fast, special production work and large all purpose models with material capacity to 42 in. All models are basically the same in operating characteristics and include as standard equipment the exclusive cam actuated idler roll and calibrated rear roll indicator shown to the right that enables operator to quickly preset rolls for a given forming operation.



No. 6 Di-Acro Roller
with 1 in. forming Rolls

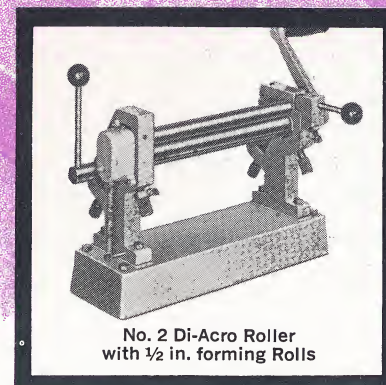
Di-Acro Roller Models

SPECIFICATIONS — DI-ACRO ROLLERS

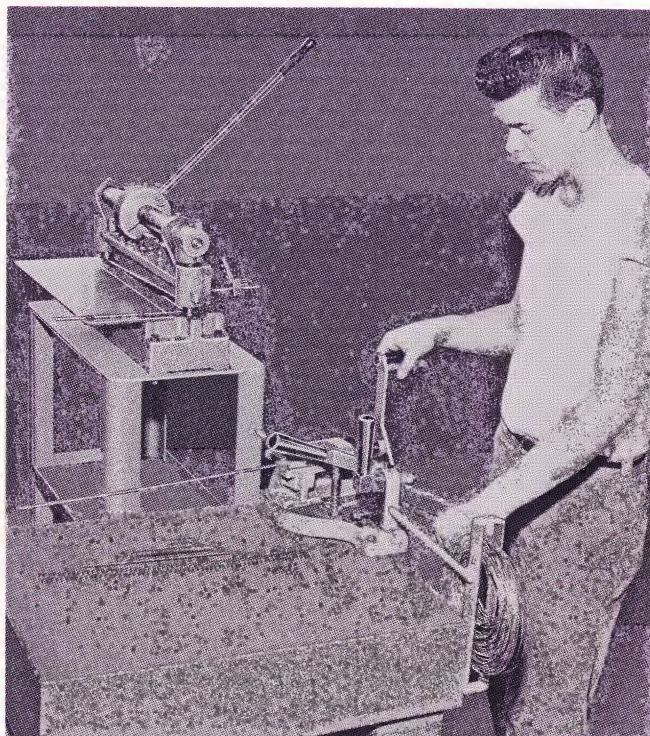
Model	No. 1	No. 2	No. 2A	No. 3	No. 4	No. 5	No. 6	No. 7
Max. Forming Width	6"	12"	12"	18"	24"	30"	36"	42"
Material Cap. — Steel	16 gauge	22 gauge	16 gauge	18 gauge	20 gauge	22 gauge	22 gauge	24 gauge
Diameter of Rolls	1"	1"	2"	2"	2"	2"	2"	2"
Minimum Radius	½"	½"	1"	1"	1"	1"	1"	1"
Maximum Radius	No limit	No limit	No limit	No limit	No limit	No limit	No limit	No limit
Floor Space (on stand)	15x18½"	15x18½"	15x18½"	15x34½"	15x40"	15x46"	15x52"	15x58"
Weight lbs., Net	40	50	100	135	158	170	210	325
Shipping	43	55	114	165	180	210	250	365
Export	53	70	130	180	225	250	300	415
Price	\$135.00	\$165.00	\$215.00	\$255.00	\$295.00	\$330.00	\$365.00	\$395.00
STAND	55.00	55.00	55.00	60.00	65.00	65.00	70.00	70.00
Weight lbs., Net	86	86	86	96	108	114	140	165
Shipping	89	89	89	100	112	116	146	171
Export	126	126	126	136	133	139	165	190

STANDARD EQUIPMENT — Operating Handles and calibrated Rear Roll Indicators that enable the operator to quickly adjust Idler Roll to a previous setting.

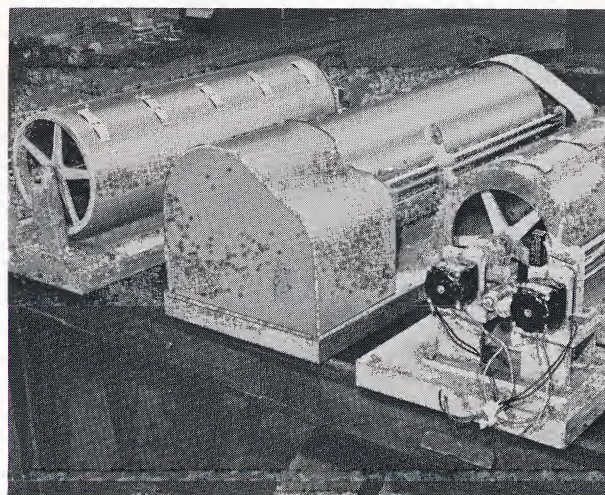
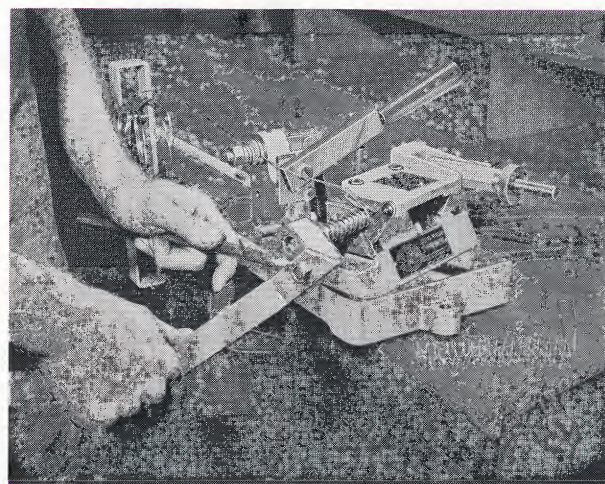
Di-Acro Rollers are also available in power models. For complete information write for catalog.



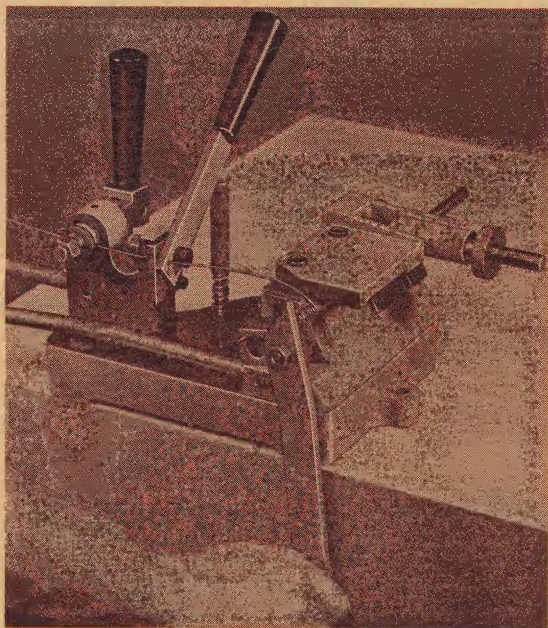
No. 2 Di-Acro Roller
with ½ in. forming Rolls



By installing a Di-Acro Spring Winder, Pierce Development Company of Cleveland has reduced costly delays incurred by having to send outside for special springs. In developing new equipment for use in the printing industry and related trades, Pierce often needs special sizes and shapes of springs, some singly, some in small quantities. The Spring Winder has enabled them to make their required spring in minutes rather than wait days for special orders. ■ Springs can also be wound to exacting tolerances to insure duplication from model to model.



A Di-Acro Spring Winder paid for itself in "no time" by saving costly production delays at Kurt Manufacturing Company, Minneapolis, Minnesota. Kurt develops and builds special industrial machinery, tools, dies, jigs, fixtures and prototypes. ■ Because much of the work is developmental, spring specifications are often determined as the product is built and tested. Some springs may be used only once, others over and over again. Keeping a stock of springs to cover these varying requirements was out of the question; they had to be ordered as needed and delays encountered when having to wait for special springs from an outside source were often costly. ■ By installing a Di-Acro Spring Winder, Kurt solved this problem. The Spring Winder produces springs in minutes which used to take days to get on order. Slight adjustments on prototypes can be made more quickly too, and new springs can be wound to exact specifications in minutes. Replacement springs can also be made in short order to the same specifications as the original or with slight variations in tension, pitch or length if needed. ■ Kurt has found the Spring Winder to be a vital asset in their operation at very little expense, since initial cost is low and a highly skilled operator is not needed for its operation.



Tescom, Inc., of Minneapolis finds constant use for its Di-Acro Spring Winder for special and experimental work. Whenever special compression or extension springs are needed, they can be produced in minutes on a Spring Winder. This results in less experimental time wasted waiting for delivery of springs and less "hidden cost" in development of the final product. ■ Since no complicated setup is required, any shop employee can produce springs as needed. Where needed, too — because the Spring Winder is small enough to be vise mounted.

The Die-less Duplicating Concept

WITH THE DI-ACRO
SPRING WINDER



The Di-Acro Spring Winder is a complete, self-contained unit, with built-in cut-off device. Just mount on a bench or stand and it's ready for operation. Simple and easy to operate, even without special skill or experience. Wire is held securely, without kinking, while winding. No fuss or wasted time trying to thread wire into a difficult holding or locking device. No bother or inaccuracy adjusting tension control each time a spring is wound.

With the Di-Acro Spring Winder you can . . .

1. Wind one spring or hundreds.
2. Duplicate springs of the same load capacity.
3. Make springs to any length.
4. Wind round, flat, square and rectangular wire.
5. Set up for operation in a jiffy; turn out springs many times faster than you could with a lathe or other method.
6. Form any gauge wire to .100" diameter.
7. Move the Di-Acro Spring Winder to any location, can be either bench or vise mounted.

The Di-Acro Spring Winder

SPECIFICATIONS — DI-ACRO SPRING WINDER

Bench space	23½"x8½"
Material capacity	.100" wire
Maximum spring diameter	1½"
Minimum spring diameter	⅛"
Price	\$110.00
Additional arbors to ⅝ in.	\$1.50 ea.
Additional arbors, ⅝ to 1½ in.	\$3.25 ea.
Weight lbs., Net 30, shipping 37, export 40.	

Complete with:

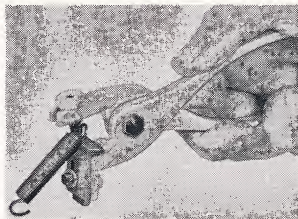
Six standard arbors in the following sizes: ⅛, ¼, ⅝, ½, ⅞, and ¾ in.

Four ¼ lb. coils of music wire in the following sizes: .028, .048, .067 and .086 in.

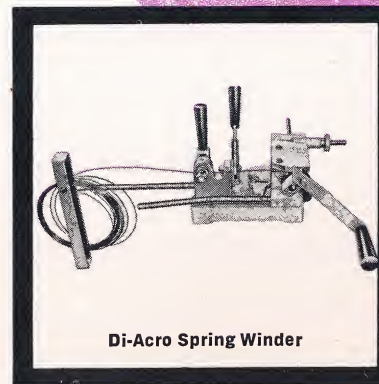
Arbors are available in sizes ⅛ through 1½ in. in steps of ⅛ in.

Spring Looping Tool

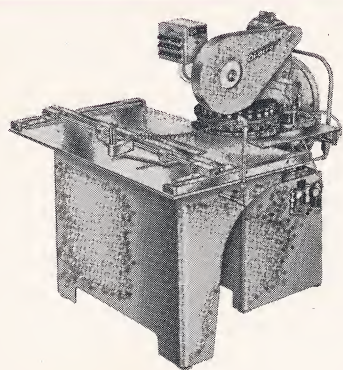
Convenient, easy-to-operate hand tool forms perfect loops on ends of coiled wire springs. Springs from ⅛ to ½ in. O.D. can be looped from wire up to .062 in. diameter.



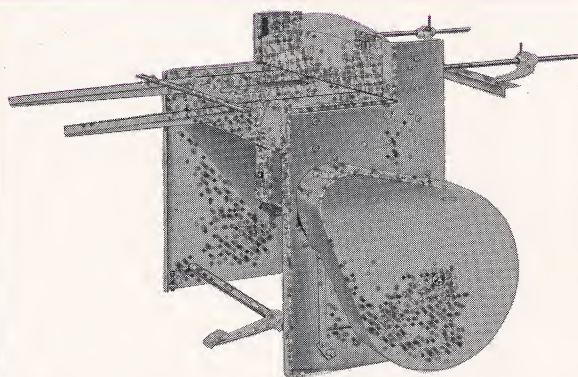
You will find many application ideas and "how to" information on Di-Acro precision metal working equipment in the complete line catalog. Specifications and costs are included on each individual machine and accessories. Write for your free copy today.



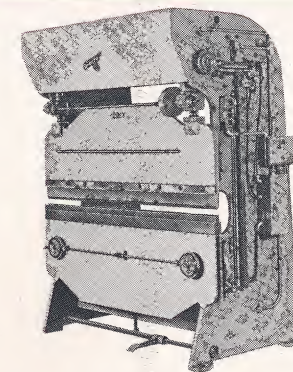
Di-Acro Spring Winder



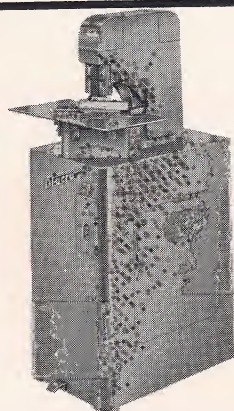
POWER PUNCH PRESSES — Stylus operated 7½-Ton model punches as fast as operator can trace template. 18 punching stations feature push button indexing. Foot operated power turret Punch Press and 5-Ton OBI press available also.



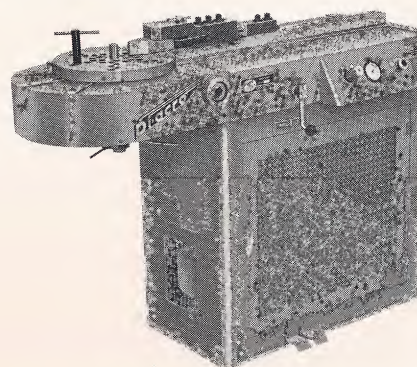
POWER SHEARS — Model 36P Power Shear is the lowest cost high speed precision shear on the market. Other models in shearing widths of 24 and 48 inches, cutting speeds to 200 strokes per minute (24" model). Capacity 16 gauge steel.



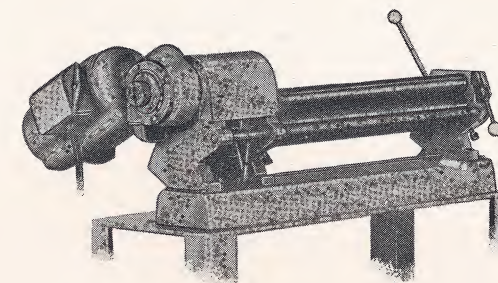
POWER PRESS BRAKES — Eight hydraulic models in 12, 17, 25 and 35-ton capacities. Bed widths from 36" to 96". All models feature stroke adjustment. Optional dual speed operating cycle. 8-ton hand operated model too.



POWER NOTCHER — 5 tons of power for cutting up to a 6" x 6" notch with up to a 1" tab. Capacity to 16 gauge steel. Can also be used for fast shearing on narrow strip stock. Model for standard 90° notch without tab also available.



POWER BENDERS — Two models in bending capacities from ⅝" to 1" round steel rod, equivalent in other shapes and metals. Maximum radii 9" and 24". Smooth hydraulic power both forward and reverse, adjustable automatic angle stops.



POWER ROLLERS — Power models from 12" to 42" forming width in 6" steps. Speed of rolls — 15 feet per minute. Calibrated rear roll indicators allow rapid presetting of rolls. Moveable foot pedal and stand are standard equipment.

di-acro®
PRECISION
METALWORKING
EQUIPMENT

DI-ACRO 300 EIGHTH AVENUE
LAKE CITY, MINNESOTA 55041
A DIVISION OF HOUDAILLE INDUSTRIES, INC.



DI-ACRO

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LAKE CITY, MINNESOTA

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971-8115

July 21, 1966

Mr. T. Nelson
Systems Consultant
Box 1546
Poughkeepsie, New York 12603

Dear Sir:

Thank you for your recent inquiry and interest in Di-Acro Precision Metalworking Equipment.

The enclosed catalog contains detailed information and costs on all hand and power operated Di-Acro Precision Metalworking Machines. Accessories including single station punches and dies, adjustable punches and dies, V-type Press Brake Dies, Rol-Form and Snap-Form Dies are also shown.

Because all Di-Acro Machines are quickly adjusted for a variety of operations--whether it is for forming or cutting a few intricate pieces for experimental work, or duplicating thousands of parts with precision accuracy--they are finding much use in model shops, experimental laboratories and production departments.

The various items illustrated in the catalog may suggest jobs in your plant that can be performed more efficiently and economically with Di-Acro Equipment. However, if you see nothing that specifically applies to your forming or duplicating problem we'll be glad to assist you in finding the answer to it. Just send us a drawing and sample of the part, together with a sample quantity of material for test purposes. Recommendations will be made in short order. There is no obligation--the services of our Application Engineering Department are always at your disposal.

At present, early delivery of most Di-Acro Equipment is possible.

We would appreciate the opportunity to serve you.

Cordially,

A handwritten signature in cursive script, reading "Ford C. Marquis".

Ford C. Marquis,
General Sales Manager

FCM/rsb
Enclosure

DDDC